

DCE- IV SEMESTER

S.N O	Course Code	Course Name	Teaching Scheme				Cre dits	Examination Scheme							
			Instruction periods per week			Tot al peri ods /se mes ter		Continuous Internal Evaluation			Semester End Examination				
			L	T	P			Mid Sem 1	Mid Sem 2	Inter nal Evalu ation	Max Mark s	Min Mar ks	Total Mark s	Min Marks for passing including internal	
1	18C-401F	Advanced Engineering Mathematics	3	1	-	60	3	20	20	20	40	14	100	35	
2	18C-402C	Strength of Materials	3	1	-	60	3	20	20	20	40	14	100	35	
3	18C-403C	Hydraulics	3	1	-	60	3	20	20	20	40	14	100	35	
4	18C-404C	Quantity Surveying	3	1	-	60	3	20	20	20	40	14	100	35	
5	18C-405C	Irrigation Engineering	3	1	-	60	3	20	20	20	40	14	100	35	
6	18C-406P	Civil Engineering Drawing	1	0	2	45	1.5	20	20	20	40	20	100	50	
7	18C-407P	Hydraulics Lab	1	0	2	45	1.5	20	20	20	40	20	100	50	
8	18C-408P	Modern Surveying Lab	1	0	2	45	1.5	20	20	20	40	20	100	50	
9	18C-409P	Civil Engineering Workshop	1	0	2	45	1.5	20	20	20	40	20	100	50	
10	18C-410P	Advanced Communication Skills and Life Skills Lab	1	0	2	45	1.5	20	20	20	40	20	100	50	
		Skill Upgradation Activities	0	0	7	105	2.5	0	0	Rubrics		--	-	0	
			20	5	17	630	25	200	200	200	400	170	1000	425	

ADVANCED ENGINEERING MATHEMATICS

Course Title	: Advanced Engineering Mathematics	Course Code	: 18C-401F
Semester	: IV	Course Group	: Foundation
Teaching Scheme in periods (L : T :P)	: 45 : 15 : 0	Credits	: 3
Methodology	: Lecture + Tutorial	Total Contact Periods	: 60
CIE	: 60 Marks	SEE	: 40 Marks

Pre requisites

This course requires the knowledge of Engg. Mathematics at Diploma first year level and Applied Engg. Mathematics at Diploma 3rd Semester level.

Course Outcomes :

At the end of the course, the student will have the ability to:

CO 1	Solve simple Homogeneous Linear Differential Equations
CO 2	Solve simple Non-Homogeneous Linear Differential Equations
CO 3	Express f(x) as a Fourier series in the given interval
CO 4	Express f(x) as a Fourier Half-Range Cosine series and Sine series
CO 5	Find Laplace transforms of simple functions
CO 6	Find Inverse Laplace transforms of simple functions and solve Linear Differential Equations using Laplace Transformations.

Blue Print of Marks for SEE

Unit No	Unit Name	Periods	Questions to be set for SEE			
			R		U	A
1	Homogeneous Linear Differential equations with constant coefficients	05	Q4	Q1	Q9(a)	Q13(a)
2	Non-Homogeneous Linear Differential equations with constant coefficients	15				
3	Fourier series	10		Q2	Q10(a)	Q14(a)
4	Fourier Half-range series	05				
5	Laplace Transforms	10		Q3	Q5,Q6	Q9(b), Q11(a), Q11(b)
						Q13(b), Q15(a), Q15(b)

6	Inverse Laplace transforms	15			Q7,Q8	Q10(b), Q12(a), Q12(b)	Q14(b), Q16(a), Q16(b)
Total		60	8			8	8

Course Contents:

Unit – I

Duration: 05 Periods (L:3.0 – T:2.0)

Homogeneous Linear Differential equations with constant coefficients

Homogenous linear differential equations with constant coefficients of order two and higher with emphasis on second order.

Unit – II

Duration: 15 Periods (L:12.0 – T:3.0)

Non-Homogeneous Linear Differential equations with constant coefficients

Non-homogenous linear differential equations with constant coefficients of the form $f(D)y = X$, where X is in the form $k(a \text{ constant})$, e^{ax} , $\sin ax$, $\cos ax$, x^n , ($n = 1, 2, 3$) Complimentary Function (CF), Particular Integral (PI) and General Solution (GS).

Unit-III

Duration: 10 Periods (L: 8.0 – T: 2.0)

Fourier series

Orthogonality of trigonometric functions, Representation of a function in Fourier series over the interval $(c, c + 2\pi)$, Euler's formulae, sufficient conditions for existence of Fourier series for a function. Even, Odd functions and Fourier series over the Interval $(0, 2\pi)$ and $(-\pi, \pi)$

Unit – IV

Duration: 05 Periods (L: 3.0 – T: 2.0)

Fourier Half-range series

Representation of a function as Fourier Half-range Sine series and Cosine series over the interval $(0, \pi)$

Unit – V

Duration: 10Periods (L: 7.0 – T:3.0)

Laplace Transformations:

Definition, sufficient conditions for existence of Laplace Transform, Laplace Transform of elementary functions, linearity property, Change of scale property, First shifting theorem ,

multiplication by t^n , division by t , Laplace Transform of derivatives and integrals, unit step function, Laplace Transform of second shifting theorem

Unit – VI

Duration: 15 Periods (L: 12.0 – T: 3.0)

Inverse Laplace transforms:

Inverse Laplace transforms- shifting theorems and change of scale property, multiplication by s^n and division by s –Inverse Laplace Transform using partial fractions – convolution theorem (no proof) – application of Laplace Transformations to solve ordinary differential equations of second order with initial conditions.

Recommended Books:

1. Higher Engineering Mathematics, B.S.Grewal .
2. Laplace Transforms - Murray R. Spiegel .
3. Ordinary Differential Equations – R. S. Aggarwal.
4. Fourier Series – A.R. Vasishtha and Gupta.

Suggested E-Learning references:

1. www.freebookcentre.net/mathematics/introductory-mathematics-books.html
2. E-books:www.mathebook.net

Suggested Learning Outcomes

Unit-I

1.0 Solve Homogeneous linear differential equations with constant coefficients in engineering situations

- 1.1 Solve Differential equations of the type $(aD^2 + bD + c)y = 0$ when the roots of the auxiliary equation are real and different, real and repeated, complex.
- 1.2 Solve the higher order homogeneous Linear differential equations with constant coefficients.

Unit-II

2.0 Solve Non Homogeneous linear differential equations with constant coefficients in engineering situations

- 2.1 Explain the concept of complementary function, particular Integral and general solution of a differential equation.
- 2.2 Solve n^{th} order differential equation of the type $f(D)y = X$ where $f(D)$ is a polynomial of second order and X is a function of the form $k, e^{ax}, \sin ax, \cos ax, x^n$.
- 2.3 Solve simple problems on the above types of 2.2

Unit-III

3.0 Understand the Fourier series expansion of functions

- 3.1 Define the orthogonality of functions in an interval.
- 3.2 Define Fourier series of a function on the interval $(C, C+2\pi)$ and write the Euler's formulae for determining the Fourier coefficients.
- 3.3 Write sufficient conditions for the existence of Fourier series for a function.
- 3.4 Write Fourier series of simple functions in the range $(0, 2\pi)$ and $(-\pi, \pi)$.
- 3.5 Write Fourier series for even and odd functions in the interval $(-\pi, \pi)$
- 3.6 Solve simple problems on even and odd functions in the interval. $(0, 2\pi)$ and $(-\pi, \pi)$

Unit- IV

4.0 Understand the Half – Range Fourier series expansion of functions

- 4.1 Write Half – Range Cosine series of a function in the range $(0, \pi)$.
- 4.2 Write Half – Range Sine series of a function in the range $(0, \pi)$.
- 4.3 Solve simple problems on Half – Range Cosine and Sine series over the interval $(0, \pi)$

Unit-V

5.0 Understand Laplace transforms

- 5.1 Write the definition of Laplace Transform and Laplace transform of standard functions.
- 5.2 Explain the sufficient conditions of existence of Laplace Transform.
- 5.3 Write the properties of Laplace Transform – Linearity property, First shifting theorem,

Change of Scale property.

- 5.4 Solve simple problems using the above properties.
- 5.5 Write formulae for Laplace transform of $t^n f(t)$, $\frac{f(t)}{t}$, $f^n(t)$, $\int_0^t f(u)du$ in terms of Laplace transform of $f(t)$
- 5.6 Solve simple problems using the above formulae.
- 5.7 Define unit step function and write the Laplace Transform of unit step function.
- 5.8 Write Second shifting theorem.

Unit-VI

6.0 Use Laplace transforms and Inverse Laplace transforms to solve differential equation in engineering problems

- 6.1 Define inverse Laplace Transform and write inverse Laplace Transforms of standard functions.
- 6.2 Solve simple problems on Inverse Laplace Transforms.
- 6.2 Write Shifting theorems and Change of scale property of inverse Laplace Transform.
- 6.3 Solve simple problems on 6.2
- 6.4 Write inverse Laplace Transforms corresponding to Laplace Transform of the functions $t^n f(t)$, $\frac{f(t)}{t}$, $f^n(t)$, $\int_0^t f(u)du$
- 6.5 Solve simple problems on 6.4
- 6.6 Define convolution of two functions and state convolution theorem.
- 6.7 Solve simple problems on Convolution theorem.
- 6.8 Use Laplace and inverse Laplace Transforms to solve simple differential equations of Second order.

Suggested Student Activities:

1. Student visits Library to refer Standard Books on Mathematics and collect related material.

- 2.Quiz
3. Group discussion
4. Surprise tests
5. Seminars
6. Home Assignments.

CO-PO Mapping Matrix

	Basic knowledge	Discipline Knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & sustainability	Ethics	Individual and Team work	Communication	Lifelong learning	Linked PO
CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	
CO1	3	2	2	1			1			3	1,2,3,4,7,10
CO2	3	2	2	1			1			3	1,2,3,4,7,10
CO3	3	2	2	1			1			3	1,2,3,4,7,10
CO4	3	2	2	1			1			3	1,2,3,4,7,10
CO5	3	2	2	1			1			3	1,2,3,4,7,10
CO6	3	2	2	1			1			3	1,2,3,4,7,10

Internal Evaluation

Test	Units	Marks
Mid Sem 1	1 and 2	20
Mid Sem 2	3 and 4	20
Slip Test 1	1 and 2	5
Slip Test 2	3 and 4	5
Assignments	-	5
Seminars	-	5
	Total	60

QUESTION PAPER PATTERN FOR MID SEMESTER EXAMS

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	4	1	Nil	4 Marks
02	Part-B	Understanding(U)	4	3	2	6 Marks
03	Part-C	Application(A)	4	5	2	10 Marks
Total Marks						20 Marks

MID SEM-I EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-I	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-II	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

MID SEM-II EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-III	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-IV	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

The length of answer for each question framed in respect of Part-A, B&C shall not exceed ¼ of a page, 1page and 2 pages respectively

QUESTION PAPER PATTERN FOR SEMESTER END EXAM

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	8	1	Nil	8 Marks
02	Part-B	Understanding(U)	8	3	4	12 Marks
03	Part-C	Application(A)	8	5	4	20 Marks
Total Marks						40 Marks

Unit No	Questions to be set for SEE				
	R		U		A
I	Q4	Q1		Q9(a)	Q13(a)
II					
III		Q2		Q10(a)	Q14(a)
IV					
V		Q3	Q5,Q6	Q9(b), Q11(a), Q11(b)	Q13(b), Q15(a), Q15(b)
VI			Q7,Q8	Q10(b), Q12(a), Q12(b)	Q14(b), Q16(a), Q16(b)
Total Questions	8		8		8

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TELANGANA
BOARD DIPLOMA EXAMINATIONS
MID SEM –I, MODEL PAPER, IV SEMESTER
ADVANCED ENGINEERING MATHEMATICS

TIME: 1: 00 Hours

Max. Marks: 20

PART-A

Instructions: 1. Answer **ALL** questions 04 X 01 = 04
2 Each question carries **ONE** mark

1. Write the General solution of $(aD^2 + bD + c)y = 0$, whose roots of auxiliary equation are real and distinct.
2. Find the roots of auxiliary equation of the differential equation $(D^2 + 2D + 1)y = 0$
3. Find the Particular Integral of $(D^2 - 4D + 1)y = e^{3x}$
4. Find the P.I of $(D^2 - 16)y = \sin 4x$

PART-B

Instructions: 1. Answer any **TWO** questions 02 X 03 = 06
2. Each question carries **THREE** marks

5 a) Solve: $(D^2 + 3D - 54)y = 0$

Or

5 b) Solve : $(D^2 + 16)y = 0$

6 a) Solve : $(D^2 + 4D + 4)y = e^{2x}$

Or

6 b) Find P.I of $(D^3 + D)y = \sin 2x$

PART C

Instructions: 1. Answer **ALL** questions 02 X 05 = 10
2. Each question carries **FIVE** marks

7 a) Solve : $(D^3 - 2D^2 - 4D + 8)y = 0$

Or

7 b) Solve : $(D^3 - D^2 - D + 1)y = 0$

8 a) Solve : $(D^2 + 36)y = \sin^2 x$

Or

8 b). Solve : $(D^2 + 3D + 2)y = x^2$

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Code: 18C-401F

**STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TELANGANA
BOARD DIPLOMA EXAMINATIONS**

**MID SEM –II, MODEL PAPER, IV SEMESTER
ADVANCED ENGINEERING MATHEMATICS**

TIME: 1: 00 Hours

Max. Marks: 20

PART-A

Instructions:

1. Answer **ALL** questions

04 X 01 = 04

2 Each question carries **ONE** mark

1. Define periodic function and give one example
2. Define Fourier series of the function $f(x)$ in the interval $(0, 2\pi)$
3. Write Half-range sine series of $f(x)$ in the interval $(0, \pi)$
4. Find a_0 for $f(x) = e^x$ in $0 < x < \pi$

PART-B

Instructions:

1. Answer any **TWO** questions

02 X 03 = 06

2. Each question carries **THREE** marks

5 a). If $f(x) = x^2$ in $(0, 2\pi)$, then find the value of a_n in Fourier series of $f(x)$

Or

5 b) If $f(x) = |x|$ in $(-\pi, \pi)$, then find the value of a_1 in Fourier series of $f(x)$

6 a). Find the value of a_n in half-range Cosine series for the function $f(x) = e^x$ in $(0, \pi)$

Or

6 b). Obtain the Fourier Half – Range Sine series for $f(x) = (\pi - x)$ in the interval $(0, \pi)$

PART C

Instructions:

1. Answer any **TWO** questions

02 X 05 = 10

2. Each question carries **FIVE** marks

7 a). Obtain the Fourier series for $f(x) = x$ in the interval $0 < x < 2\pi$

Or

7 b). Find the Fourier series for $f(x) = (x - x^2)$ in the interval $(-\pi, \pi)$. Hence show that

$$\frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \dots + \frac{\pi^2}{12}$$

8 a) Express $f(x) = \pi x - x^2$ as a half-range Sine series in $(0, \pi)$

Or

8 b). Find the half –range cosine series for the function $f(x) = x^2$ in the interval $(0, \pi)$

18C-401F

BOARD DIPLOMA EXAMINATION, (C-18)
SEMESTER END EXAM MODEL PAPER
IV SEMESTER EXAMINATION
ADVANCED ENGINEERING MATHEMATICS

Time: 2 hours

[Total Marks: 40]

PART-A

Instructions:

1. Answer **ALL** questions

08 X 01 = 08

2 Each question carries **ONE** mark

1. Find the roots of auxiliary equation of the differential equation $(D^2 + 4D)y = 0$.
2. Define Fourier Series for the function $f(x)$ in the interval $(c, c+2\pi)$
3. Find the Particular Integral of $(D^2 - 4D + 1)y = e^x$
4. Find $L(e^{2t} + \cos 3t)$
5. Find $L(t + 5\cosh t)$
6. State the First Shifting theorem of Laplace Transforms.
7. Find $L^{-1}\left(\frac{1}{s-3} + \frac{s}{s^2+4}\right)$
8. Find $L^{-1}\left(\frac{1}{2s+5}\right)$

PART-B

Instructions:

1. Answer any **FOUR** questions

04 X 03 = 12

2. Each question carries **THREE** marks

9. a) Solve: $(D^2 + D + 1)y = 4e^{3x}$

Or

- 9 b) Find $L(t\cos 3t)$

- 10 a) Find Half Range Sine Series of $f(x) = x$ in $(0, \pi)$

Or

10 b) Find $L^{-1}\left(\frac{s+1}{s^2+6s-7}\right)$

11 a) If $L\{f(t)\} = \frac{20-4s}{s^2-4s+20}$, find $L\{f(3t)\}$

Or

11 b) Find $\int_0^\infty t \cdot e^{-2t} \sin 3t dt$ using Laplace Transform Technique

12 a) Show that $L^{-1}\left(\frac{1}{s(s^2+a^2)}\right) = \frac{1-\cos at}{a^2}$

12 b) Find $L^{-1}\left(\frac{s}{(s+2)^2+4}\right)$

PART C

Instructions: 1. Answer any **FOUR** questions

04 X 05 = 20

2. Each question carries **FIVE** marks

13. a) Solve : Solve: $(D^2 + D - 2) y = x + \sin x$

Or

13 b) Find $L[te^t \sin 3t]$

14 a) Expand $f(x) = x^2$ as a Fourier series in the interval $(-\pi, \pi)$

Or

14 b) Find $L^{-1}\left(\frac{s}{(s+1)^2(s^2+1)}\right)$

15 a) Find $L\left(\frac{\sin 3t \cdot \cos t}{t}\right)$

Or

15 b) Evaluate $L\left\{\int_0^t \frac{\sin t}{t} dt\right\}$

16 a) Find $L^{-1}\left(\frac{1}{(s+1)(s+2)}\right)$ using Convolution theorem .

Or

16 b). Solve the differential equation $y'' - 2y' - 8y = \sin t$, when $y(0) = 3$, $y'(0) = 6$ by

Laplace Transform method.

State Board of Technical Education & Training (TS)
Department of Technical Education

Course Title:	Strength of Materials	Course Code	18C-402C
Semester	IV Semester	Course Group	Core
Teaching Scheme in Periods (L:T:P)	45:15:0	Credits	3
Methodology	Lecture+Assignments	Total Contact Periods	60 Periods
CIE	60 Marks	SEE	40 Marks

Pre requisites

Knowledge of Engineering Mechanics

Course Outcomes

Upon completion of the course, the student shall be able to

CO1	Develop Shear Force and Bending Moment Diagrams for different types of beams
CO2	Apply Euler's formula and Rankine's formula for columns to arrive at critical load over the column
CO3	Apply geometrical properties of beam to calculate strength parameters like flexural stress and shear stress in beams for different loading conditions.
CO4	Calculate the capacity of circular shafts in generating Power according to sectional properties.
CO5	Calculate the deformation (Slope & deflection) of Beams by Double Integration Method
CO6	Analyse the beams to calculate slope and deflection using Macaulay's method and Moment area method.

Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Periods	Questions to be set for SEE			
			R		U	A
I	Shear force and Bending Moment	12	Q4	Q1	Q9(a)	Q13(a)
II	Columns and Struts	08				
III	Theory of simple bending	10		Q2	Q10(a)	Q14(a)
IV	A) Shear stress in beams	05				
	B) Torsion	05				
V	Deflection of beams-I	08	Q3	Q5,Q6	Q9(b),Q11(a), Q11(b)	Q13(b),Q15(a), Q15(b)
VI	Deflection of beams-II	12		Q7,Q8	Q10(b),Q12(a), Q12(b)	Q14(b),Q16(a), Q16(b)
	Total	60	8		8	8

Course Contents

UNIT - 1: Shear Force and Bending Moment

Duration: 12 Periods (L: 9.0 – T:3.0)

Concepts of S.F. and B.M.-Sign Convention - Relation between Rate of Loading, S.F. and B.M -S.F. and B.M.diagrams for Cantilevers, Simply Supported beams, Overhanging beams subjected to point loads and uniformly distributed loads - Maximum B.M and maximum S.F in beams for various loads- position and significance of points of contra flexure

UNIT - 2: Columns and struts

Duration: 08 Periods(L: 6.0 – T:2.0)

Importance and Calculation of Least Moment of Inertia, radius of gyration and slenderness ratio for Solid circular, Hollow circular, Rectangular, I sections and Built up sections – Compression Members-Types and Classification - Short and Long columns, failures - Different end conditions - Effective length - calculation of safe load on columns with axial load only by Euler's and Rankine's formula - Limitation of Euler's formula.

UNIT - 3: Theory of Simple Bending

Duration: 10 Periods(L: 7.5 – T:2.5)

Bending stress in beams :Introduction –Simple Bending Bending Stress in beams – Bending Equation (Derivation not required) – Neutral Axis - Section Modulus, Flexural Rigidity, Modulus of Section, Radius of curvature, Moment of Resistance – Calculation of bending stresses in Symmetrical and Unsymmetrical sections-practical applications.

UNIT – 4(A):Shear stress in beams

Duration: 5 Periods (L:4.0 – T:1.0)

Shear Stress distribution diagrams for various symmetrical beam sections such as rectangular, solid circular and I & T sections - Calculation of shear stress in different layers of a beam for rectangular and I section (Derivation of formula not required) – Calculation of Maximum shear stress in rectangular, circular and I sections -problems

UNIT- 4(B): Torsion

Duration: 05 Periods (L:4.0 – T:1.0)

Introduction – Theory of torsion – Assumptions – Torsion formula (Derivation not required) – Solid and hollow circular shafts subjected to pure torsion – Simple problems – Shear stress distribution in shafts - Power transmitted by circular shafts – Problems

UNIT - 5: Deflection of Beams -I

Duration: 08 Periods(L: 6.0 – T:2.0)

Introduction – Deflected profiles of beams with different support conditions – Strength and stiffness of beams – Relation between curvature, slope and deflection - Slope and

deflection for simply supported beams under symmetrical loading – Slope and deflection in cantilever beams under point load and udl- Double integration method – Derivation of standard cases – Problems.

UNIT - 6: Deflection of Beams –II

Duration: 12 Periods(L: 9.0 – T:3.0)

- a) Macaulay's method for slope and deflection–Simply supported beams under concentrated and uniformly distributed loads – Problems.
- b) Mohr's theorems for slope and deflection – Cantilevers and simply supported beams with symmetrical loading – Problems.

Reference Books

- | | | | |
|-----|--|----|-------------------|
| 1. | Strength of Materials | by | S. Ramamurtham. |
| 2. | S.M and T.S | by | B.C. Punmia. |
| 3. | S.M and T.S | by | N. Srinivasulu. |
| 4. | Introduction to Strength of Materials | by | D.S. Prakash Rao. |
| 5. | Strength of Materials (A practical approach) Vol-I | by | D.S. Prakash Rao. |
| 6. | Strength of Materials | by | R.K. Bansal |
| 7. | S.M. and T.S. | by | Y. Ram Mohan Rao |
| 8. | Strength of Materials | by | L.S. Negi |
| 9. | Mechanics of Solids | by | E P Popov |
| 10. | Elements of strength of materials | by | Timoshenko |

Suggested E-learning references

- 1. www.elearning.com/survey
- 2. <http://nptel.ac.in>

Suggested Learning Outcomes

Upon completion of the course, the student shall be able to

- 1.1 Explain terms:
 - a) Shear Force
 - b) Bending Moment
- 1.2 Explain the sign conventions used to calculate Shear Force and Bending Moment

- 1.3 Explain the relationship between the rate of loading, shear force and bending moment
 - 1.4 Determine Shear Force and Bending Moment on Cantilevers, Simply Supported Beams and Overhanging beams for simple cases of loading (Point Load, Uniformly distributed load) analytically
 - 1.5 Determine maximum SF and maximum BM for various loading conditions in beams.
 - 1.6 Describe the procedures for sketching the Shear Force Diagrams (SFD) and Bending Moment Diagrams (BMD)
 - 1.7 Sketch Shear Force Diagrams (SFD) and Bending Moment Diagrams (BMD) for Cantilever and Simply Supported Beams
 - 1.8 Determine point of contraflexure and explain its significance
-
- 2.1 List different types of compression members
 - 2.2 Define :
 - i) Buckling/Critical/Crippling Load ii) Actual length iii) Slenderness ratio
 - iv) Least radius of gyration v) Safe load vi) Factor of safety
 - 2.3 State the classification of columns based on slenderness ratio OR length and lateral dimensions
 - 2.4 Calculate least radius of gyration for solid circular, hollow circular, square, rectangular sections, I-sections and built up sections
 - 2.5 List different end conditions for a column
 - 2.6 Find the effective lengths of columns for different end conditions
 - 2.7 Calculate the slenderness ratio for a given column
 - 2.8 State Euler's formula for crippling load of a column (derivation not required)
 - 2.9 Solve problems on limitations of Euler's formula
 - 2.10 Calculate crippling and safe loads on a column with simple and built up sections using Euler's formula
 - 2.11 Explain the validity of Rankine's formula for short and long columns using basic Rankine's empirical formula
 - 2.12 Calculate crippling or safe loads on a column with simple and built up section using Rankine's formula
 - 2.13 Calculate the ratio of strengths of hollow and solid circular columns loaded under same conditions
 - 2.14 Design a hollow circular cross section of a column for the given data
 - 2.15 Calculate the ratio of strengths of a section using Euler's and Rankine's formulae under same conditions
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- 3.1 Explain simple / pure bending

- 3.2 Define terms
 - a) Neutral layer
 - b) Neutral axis
 - c) Radius of curvature
 - d) Moment of Resistance
 - e) Modulus of section
 - f) Flexural rigidity
- 3.3 State the assumptions made in the theory of simple bending.
- 3.4 Sketch and explain bending stress distribution across the depth of the beam for any cross section
- 3.5 Obtain the formula for section modulus of (solid and hollow sections):
 - a) Square Section
 - b) Rectangular Section
 - c) Circular Section
- 3.6 Calculate section modulus based on above formulae
- 3.7 Solve problems on theory of simple bending for symmetrical and unsymmetrical sections to calculate Moment of Resistance, Design of cross section.

- 4.1 State formula for calculation of Shear Stress in any layer of a cross section
- 4.2 Draw shear distribution diagram across:
 - i) Rectangular section
 - ii) Solid circular section
 - iii) Symmetrical **I** - section
 - iv) **T** - section
- 4.3 Determine shear stress at any layer and draw shear stress distribution diagram across:
 - i) Rectangular section
 - ii) Symmetrical **I** - section
- 4.4 Determine the maximum shear stress in circular, rectangular and square and **I** sections
- 4.5 State pure Torsion
- 4.6 State the assumptions made in the pure Torsion
- 4.7 State the formula for pure Torsion of a circular shaft
- 4.8 Solve the problems on Torsion applying Torsion formula
- 4.9 Explain terms:
 - i) Polar modulus
 - ii) Torsional rigidity
- 4.10 State the formula for power transmitted by the circular shaft

- 4.11 Solve the problems on power transmitted by the solid and hollow circular shafts
- 4.12 Computes the dimensions of a solid / hollow circular shaft based on strength

- 5.1 Draw the deflected shapes of different beams
- 5.2 Define:
 - i. Elastic curve
 - ii. Slope
 - iii. Deflection
- 5.3 Distinguish between strength and stiffness of a beam.
- 5.4 Derive relation between slope, deflection and radius of curvature
- 5.5 Derive the equations for maximum slope and deflection by double integration method for:
 - i. Cantilever beams with point loads and uniformly distributed loads (standard cases).
 - ii. Simply supported beams with central point load, uniformly distributed load throughout and their combination.
- 5.6 Calculate the maximum slope and deflection in simply supported and cantilever beams using the above formulae

- 6.1 Explain Macaulay's method (for Simply supported beams) to find the slope and deflections
- 6.2 Compute the maximum slope and deflection for Simply supported beam carrying point loads and uniformly distributed loads by Macaulay's method
- 6.3 Define:
 - i) Mohr's theorem-I
 - ii) Mohr's theorem-II
- 6.4 Derive formulae for maximum slope and deflection in standard cases (simply supported and cantilever beams) by moment area method using Mohr's theorems
- 6.5 Compute the maximum slope and deflections for Cantilever and Simply Supported Beams by Mohr's theorem-I and Mohr's theorem-II (moment area method)

Suggested Student Activities

1. Visit the Institute's Library / internet center and list the books/journals/ e-books and any other resources available on the topics suggested by the teacher.

2. Prepare references consisting name of the author, title of the book/paper, publication and place of publication, volume No.s, page numbers and year of publication on the following topics
- Beam column joints.
 - Mohr's theorem
 - Bending Test on Wood and Mild steel.

CO-PO Mapping Matrix

	Basic knowledge	Discipline Knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & sustainability	Ethics	Individual and Team work	Communication	Lifelong learning	Linked PO
CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	
CO1	1	3		2				2	2		1,2,4,8,9
CO2		2	1						2	1	1,2,3,9,10
CO3	1	3	1						2	2	1,2,3,9,10
CO4		2	2	2						2	2,3,4,10
CO5	2	2	2							1	1,2,3,10
CO6	2	3	2	1				2		2	1,2,3,4,8,10

Internal Evaluation

Test	Units	Marks
Mid Sem 1	1 and 2	20
Mid Sem 2	3 and 4	20
Slip Test 1	1 and 2	5
Slip Test 2	3 and 4	5
Assignments		5
Seminars		5
	Total	60

QUESTION PAPER PATTERN FOR MID SEMESTER EXAMS

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	4	1	Nil	4 Marks
02	Part-B	Understanding(U)	4	3	2	6 Marks
03	Part-C	Application(A)	4	5	2	10 Marks
Total Marks						20 Marks

MID SEM-I EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-I	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-II	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

MID SEM-II EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-III	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-IV	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

The length of answer for each question framed in respect of Part-A, B&C shall not exceed $\frac{1}{4}$ of a page, 1 page and 2 pages respectively

QUESTION PAPER PATTERN FOR SEMESTER END EXAM

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	8	1	Nil	8 Marks
02	Part-B	Understanding(U)	8	3	4	12 Marks
03	Part-C	Application(A)	8	5	4	20 Marks
Total Marks						40 Marks

Unit No	Questions to be set for SEE				
	R			U	A
I	Q4	Q1		Q9(a)	Q13(a)
II					
III		Q2		Q10(a)	Q14(a)
IV					
V		Q3	Q5,Q6	Q9(b), Q11(a), Q11(b)	Q13(b), Q15(a), Q15(b)
VI					
Total Questions	8		8	8	

State Board of Technical Education and Training, Telangana
Model Question paper
DCE IV semester
Mid Semester-I Examination

Corse Code: 18C-402C
Course Name: STRENGTH OF MATERIALS

Duration: 1 hour
Max. Marks: 20 Marks

PART-A

Answer **all** questions, Each Question carries one mark

4x1 = 4 Marks

1. Show the SFD and BMD for a cantilever beam of span 'l' with a point load of 'W' at the end indicating Maximum values.
2. Show the SFD and BMD for a simply supported beam of span 'l' with a UDL of 'w kN/m' throughout the span indicating Maximum values.
3. State any three assumptions made in Euler's theory of columns.
4. State different end conditions of columns.

PART-B

Answer **TWO** questions. Each question carries **THREE** marks

2x 3 = 6 Marks

- 5(a). A simply supported beam of span 6m is carrying a point load of 30kN at a distance of 4m from LHS and a UDL of 12kN/m over entire span. Calculate maximum Bending moment and draw BMD.

(OR)

- 5(b). A cantilever of span 6m carries two point loads of 10kN and 20kN at a distance of 1m and 4m from fixed support. Draw BMD

- 6(a). A rectangular column of cross section 200mm x 300mm, 5m long is fixed at one end and hinged at the other. Determine the Euler's critical load on the column if $E = 200 \text{ kN/mm}^2$.

(OR)

- 6(b). A solid circular section of diameter 150mm is used as a column of length 4m. It is fixed on both ends. Determine the Rankine's buckling load. Given $f_c = 500 \text{ N/mm}^2$ and $a = 1/1600$

PART-C

Answer **TWO** questions. Each question carries **FIVE** marks

2x 5 = 10 Marks

- 7(a). A cantilever beam of span 6m is subjected to 2 point loads 10kN, 15kN at a distance of 2m, 6m from fixed end. In addition to them it carries a udl of 5kN/m throughout the span. Draw SFD and BMD.

(OR)

- 7(b). A 7m span beam is simply supported between 5m and is overhanged for a length of 2m on right side. It carries 2 point loads 25kN and 18kN acting at 3m and 7m from LHS. Draw SFD and BMD.
- 8(a). A solid circular cast iron column whose diameter is 200mm is 4m long. It is fixed at both ends. Calculate the ratio of Euler's and Rankine's critical load. $f_c = 500 \text{ N/mm}^2$ and $a = 1/1600$

(OR)

- 8(b) A straight bar 3m long is used as a strut with both ends fixed. When an axial load of 8 kN is applied the bar is found to buckle. What should be the diameter of rod. Take $f_c = 330 \text{ N/mm}^2$ and $a = 1/1750$

State Board of Technical Education and Training, Telangana
Model Question paper
DCE IV semester
Mid Semester-II Examination

Corse Code:18C-402C
Course Name: STRENGTH OF MATERIALS

Duration:1 hour
Max.Marks:20 Marks

PART-A

Answer **ALL** questions, Each Question carries **ONE** mark **4x1 = 4 Marks**

1. Define Neutral axis of the section and state where it lies for any section.
2. Define Section Modulus and state its units.
3. Define pure torsion and write the units for twisting moment.
4. Define torsion and write any three practical examples of application of torsion.

PART-B

Answer **TWO** questions. Each question carries **THREE** marks **2x 3 = 6 Marks**

- 5(a). A steel rod 100mm diameter is to be bent to a circular shape. Find the minimum radius of curvature to which it should be bent so that stress in the steel may not exceed 120 N/mm^2 . Take $E = 2 \times 10^5 \text{ N/mm}^2$.

(OR)

- 5(b). A steel flat of size 120mm wide and 25mm thick is bent into a circular arc of radius 5m. Find the maximum stress induced and the bending moment which can produce this stress. Take $E = 2 \times 10^5 \text{ N/mm}^2$.
- 6(a). A steel shaft having a modulus of rigidity as 80 kN/mm^2 is twisted by 1 degree 30 minutes in a length of 2m. The shaft is solid circular with diameter 80mm. Determine the Torque required.

(OR)

- 6(b). A hollow steel shaft has 120mm outer diameter and 15mm thickness. When transmitting power at 150 r.p.m the angle of twist per metre length was one degree. Find the power transmitted by the shaft. Take $G = 80 \text{ kN/mm}^2$.

PART-C

Answer **TWO** questions. Each question carries **FIVE** marks **2x 5 = 10 Marks**

- 7(a). A rectangular beam 300mm deep is simply supported over a span of 3m. What “udl” the beam can carry, if the bending stress is not to exceed 120 MPa? Take $I = 80 \times 10^6 \text{ mm}^4$.

(OR)

- 7(b). A cast iron beam of symmetrical I-section with top flange 150mm x 10mm, bottom flange 150mm x 10mm and web 280mm x 10mm is simply supported over a span of 6m. If the permissible bending stress is 110 N/mm^2 , what uniformly distributed load can be safely applied on the beam?
- 8(a). A solid steel shaft is to transmit a torque of $1 \times 10^8 \text{ N.mm}$. If the shearing stress does not exceed 45 N/mm^2 , Find the minimum diameter of the shaft.

(OR)

- 8(b). A hollow circular shaft 120mm external diameter has to transmit 120 kW power at 200 r.p.m. The angle of twist on a length of 3m was observed to be 0.85 degree. Find the thickness of the shaft. Take $G = 80 \text{ kN/mm}^2$

State Board of Technical Education and Training, Telangana

Model Question paper

DCE IV semester

IV Semester End Examination

Corse Code: 18C-402C

Course Name: STRENGTH OF MATERIALS

Duration: 2 hours

Max. Marks: 40 Marks

PART-A

Answer **all** questions. Each Question carries one mark

8x1 = 8 Marks

1. What are the sign conventions to calculate Shear Force and Bending Moment in beams.
2. Define Section Modulus and state its units.
3. Write the equations for max. Slope and max. Deflection of a simply supported beam subjected to a total u.d.l of **W** over its whole span.
4. Differentiate between Short column and Long column.
5. Define slope and deflection.
6. Define Elastic curve of a beam and show the deflected shapes of
 - (i) Simply supported and
 - (ii) Cantilever beams.
7. State the relation between curvature, slope and deflection of a loaded beam and explain the terms.
8. Differentiate between strength and stiffness of a beam.

PART-B

Answer **FOUR** questions. Each question carries three marks.

4 x 3 = 12 Marks

- 9(a). A cantilever beam of span 6m is subjected to 2 point loads 20kN and 30kN at a distance of 3m and 6m from fixed end. Draw SFD and BMD for the beam and summarize maximum values.

(OR)

- 9(b). A cantilever beam of span 5m carries a u.d.l at the rate of w/m. The section of the beam is 100mm x 200mm and the value of E of the beam material is $2 \times 10^4 \text{ mm}^4$. Determine the value of 'w' if the maximum deflection is 8mm.

- 10(a). A simply supported beam of symmetrical section 300mm deep and $I = 120 \times 10^6 \text{ mm}^4$ carries a UDL of 15 kN/m throughout the span. Calculate maximum span of the beam if the maximum bending stress is not to exceed 160 N/mm^2

(OR)

- 10(b). A cantilever beam of span 3m carries a point load of 30kN at its free end. Calculate the slope and deflection at the free ends using Mohr's theorems. Take $EI = 4000 \text{ kN-m}^2$.
- 11(a). A simply supported beam is 6m long, 200mm wide and 350mm deep. Calculate the maximum central point load the beam can carry so that the maximum deflection does not exceed 10mm.

(OR)

- 11(b). A cantilever of span 3m carries a UDL of 10kN/m over a length of 2m from fixed support. Calculate the deflection at the free end.
- 12(a). A simply supported beam of span 'L' carries a point load of 'W' at the centre of beam. Derive a formula to calculate the maximum slope in the beam. Use Moment Area method.

(OR)

- 12(b). Write the boundary conditions to attain maximum slope and maximum deflection for the following cases.
- a) Simply supported beam with a UDL of 'w' kN/m acting throughout the span 'L'.
 - b) Cantilever beam of span 'L' with a point load 'W' at the free end.

PART-C

Answer **FOUR** questions. Each Question carries five marks

4 x 5 = 20 Marks

- 13(a) A simply supported beam of span 5m is carrying a point load of 40kN at a distance of 2m from LHS and a UDL of 10 kN/m over entire span. Calculate maximum Bending moment and draw BMD.

(OR)

- 13(b) Derive a formula to calculate maximum slope for a simply supported beam with concentrated load at the centre, using Double integration method.
- 14(a) A symmetrical I-section with flange dimensions 180mm x 10mm and web 12 x 250mm is used as a beam having overall depth 270mm, to resist a Shear Force of 60kN. Find the maximum Shear stress developed in the beam.

(OR)

- 14(b) A RSJ is freely supported over a span of 5m carrying central concentrated load of 20 kN. Find the position and magnitude of maximum deflection. Use Maculay's method. $E = 200 \text{ kN/mm}^2$, $I = 73.3 \times 10^6 \text{ mm}^4$.
- 15(a) Derive a formula to calculate maximum slope for a simply supported beam with a udl of 'w' kN/m throughout the span, using Double integration method.

(OR)

15(b) Derive a formula to calculate maximum slope and maximum deflection for a cantilever beam with a point load 'W' at the free end, using Double integration method.

16(a) A cantilever of span 6m carries a UDL of 10kN/m for a length of 4m from fixed end and a point load of 12 kN at the free end. Determine maximum slope and deflection at the free end by Moment area method. Given $E = 200 \text{ kN/mm}^2$, $I_{xx} = 32 \times 10^6 \text{ mm}^4$.

(OR)

16(b) A I-section is used as a simply supported beam of span 5m to carry two point loads of 20kN each at a distance of 1.5m from both the supports. Find the position and magnitude of maximum deflection. Take $E = 2 \times 10^5 \text{ N/mm}^2$, $I = 73.33 \times 10^6 \text{ mm}^4$. Use Maculay's method.

State Board of Technical Education & Training (TS)

Course Title:	Hydraulics	Course Code :	18C-403C
Semester:	IV Semester	Course Group :	Core
Teaching Scheme in Periods(L:T:P):	45 :15 :0	Credits :	3
Methodology :	Lecture+Assignments	Total Contact Periods :	60 Periods
CIE :	60 Marks	SEE :	40 Marks

Pre requisites

Knowledge of Basic Engineering Mathematics and Engineering Physics

Course Outcomes

Upon the completion of the course, the student shall be able to

CO1	Calculate fluid pressure using pressure measuring devices and compute the forces on immersed plane surfaces.
CO2	Apply the general principles of flow of liquids and Bernoulli's theorem and its applications in solving problems on discharge and pressure measurements using flow measuring devices.
CO3	Determine the discharge and coefficients of discharge for Orifices and Mouthpieces, Notches and Weirs
CO4	Compute the major loss and various minor losses of head in flow through pipes.
CO5	Calculate the flow parameters and design the most economical channel section.
CO6	Explain the working principles of pumps, Turbines and layout of a typical Hydro-electric power station.

Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Periods	Questions to be set for SEE				
			R		U	A	
1	Properties of fluids and Measurement of fluid pressure	10	Q4	Q1		Q9(a)	Q13(a)
2	Flow of fluids	10					
3	Flow through orifices, mouthpieces, notches and weirs	10		Q2		Q10(a)	Q14(a)
4	Flow through pipes	10					
5	Open channel flow	10		Q3	Q5,Q6	Q9(b), Q11(a), Q11(b)	Q13(b), Q15(a), Q15(b)
6	Pumps, turbines and hydroelectric power plants	10			Q7,Q8	Q10(b), Q12(a), Q12(b)	Q14(b), Q16(a), Q16(b)
Total		60	8		8	8	

Course Contents

UNIT 1: Properties of fluids and Measurement of fluid pressure:

Duration: 10Periods(L:7.5 – T:2.5)

- a) Scope and importance of Hydraulics in Civil Engineering
- b) Fluids - classification - Properties – Formulae- units
- c) Pressure- types – relationship - Pressure measuring Instruments
- d) Total pressure and Centre of pressure on plane surface immersed in liquid - Numerical problems
- e) Practical Applications- Lock gates (Description only)

UNIT 2 : Flow of fluids

Duration:10Periods(L:7.5 – T:2.5)

- a) Types of Flow - Rate of flow or discharge-continuity equation- Numerical problems
- b) Total energy of liquid in motion – Bernoulli's theorem (without proof) - Numerical Problems.
- c) Applications of Bernoulli's theorem – Numerical problems

UNIT 3: Flow through Orifices, Mouth Pieces, Notches and weirs

Duration: 10Periods (L:7.5 – T:2.5)

- a) Orifice-types of Orifices- Large Rectangular Orifice- - Numerical Problems.
- b) Mouth piece-Types of Mouth pieces
- c) Notch - types of notches - rectangular, triangular and trapezoidal notches-Numerical problems
- d) Weirs - types of weirs - Numerical problems - (Derivation of formulae not required)

UNIT4: Flow thorough pipes

Duration :10Periods(L:7.5 – T:2.5)

- a) Frictional loss in pipes - Chezy's formula and Darcy's formula (without proof) – Numerical problems.
- b) Types of Minor Losses
- c) Hydraulic gradient and Total energy line.
- d) Discharge through parallel pipes and compound pipes (series) connected to a reservoir. (simple problems)

UNIT5:Open Channel Flow Duration: 10Periods(L:7.5 – T:2.5)

- a) Open channel flow - Discharge through open channel - Chezy's and Manning's formula (derivation not necessary). - Numerical problems
- b) Geometric properties of open channel
- c) Empirical formulae for value of C.
- d) Most economical section of a channel-rectangular and trapezoidal sections - (Simple numerical Problems)

UNIT 6: Pumps, Turbines and Hydro-electric Power plants

Duration: 10 Periods (L:7.5 – T:2.5)

- a) Pumps - types - Reciprocating pumps and Centrifugal pumps.
- b) Classification of Turbines-impulse and reaction turbines.
- c) Sketch a typical layout of a hydroelectric power plant – component parts – Functions of surge tank

Reference Books

- 1. Reya&Rao, Hydraulics
- 2. Modi&Seth, Hydraulics & Fluid Mechanics
- 3. Bansal, Fluid Mechanics &Hydraulics

Suggested E-learning references

- 1. <http://nptel.ac.in>
- 2. You tube vedios on working of pumps and turbines.
- 3. Profile of a company manufacturing pumps and turbines on internet.
- 4. Wikipedia search on the different terms used in hydraulics

Suggested Learning Outcomes

Upon completion of course, the students shall be able to

- 1.1 Explain the scope and importance of Hydraulics in Civil Engineering.
- 1.2 Define fluid and List examples of fluids
- 1.3 Differentiate between ideal and real fluids.

- 1.4 Define - Mass density, Specific weight, Specific gravity, Adhesion, Cohesion, Surface tension, Capillarity, Compressibility, Dynamic Viscosity, Kinematic viscosity and Vapour pressure - State the units and formulae
- 1.5 Define 1. Atmospheric pressure, 2. Gauge pressure and 3. Absolute pressure.
- 1.6 Describe the following pressure measuring instruments and Compute the pressure of a flowing fluid
 - a) Piezometers, manometers,
 - b) U- tube Differential manometers.
 - c) Mechanical pressure gauge-Bourdon's pressure gauge
- 1.7 Define 1. Total Pressure and 2. Centre of Pressure.
- 1.8 Calculate Total pressure and Centre of pressure on the following surfaces immersed in a liquid at rest:
 - a) Horizontal plane,
 - b) Vertical plane and
 - c) Inclined plane
- 1.9 Practical applications-Lock gates(description only)

- 2.1 State the different types of flow of liquids
- 2.2 Define Uniform flow, Non-uniform flow, Steady flow, Unsteady flow, Laminar flow and Turbulent flow.
- 2.3 State one dimensional Continuity equation.
- 2.4 State the equation for Bernoulli's theorem of Total energy of liquids in motion.
- 2.5 Compute the pressure and velocity at a section of flowing liquid in a pipe for the given conditions using Bernoulli's equation.
- 2.6 Describe the working principle and Compute the actual discharge of flowing liquid through
 - i. Venturimeter,
 - ii. Orifice meter and
 - iii. Pitot tube.

- 3.1 Define orifice and list different types of orifices
- 3.2 Distinguish between small and large orifices
- 3.3 Define vena- contracta, C_c , C_v , and C_d (Hydraulic coefficients). .
- 3.4 State the formulae for actual, theoretical discharges through small orifice
- 3.5 Calculate the discharge, C_c , C_v , C_d for given conditions-Numerical Problems

- 3.6 Derive formula for discharge through Large Rectangular Orifice and Calculate discharge through Large Rectangular Orifice for given conditions-Numerical Problems.
- 3.7 Define Mouth piece - Classify mouth pieces.
- 3.8 Calculate discharge through a Mouth piece for given data- Numerical Problems.
- 3.9 Define a Notch and list different types of notches.
- 3.10 Calculate the discharge over following Notches: Rectangular, Triangular and Trapezoidal
- 3.11 Define Weir and list the different types of weirs.
- 3.12 Determine the discharge over sharp crested and broad crested weirs under given conditions - Numerical Problems.
- 3.13 Determine the discharge over rectangular weir using Francis and Bazin's empirical formulae

- 4.1 List the various losses that occur when water flow through pipes.
- 4.2 Differentiate Major loss and Minor losses.
- 4.3 Compute loss of head due to friction using Chezy's and Darcy's equations
- 4.4 Compute the various minor losses of head for given data –Numerical problems.
- 4.5 Define Hydraulic gradient line and Total energy line.
- 4.6 Calculate discharge through Parallel and Compound (series) Pipes connected to reservoir for given data- Numerical Problems.

- 5.1 Define open channel flow.
- 5.2 Differentiate open channel flow and pipe flow.
- 5.3 Define Wetted perimeter and Hydraulic mean depth/radius.
- 5.4 State Chezy's formula and Manning's formula for uniform flow through open channels.
- 5.5 List the Values of 'C' for different surfaces
- 5.6 State the following formulae to evaluate 'C'
 - a) Kutter's formula,
 - b) Manning's formula
 - c) Bazin's formula .
- 5.7 Calculate Velocity and Discharge in a channel using Chezy's and Manning's formulae for given conditions-Numerical problems.
- 5.8 Define most economical section of a channel.
- 5.9 List the conditions for most economical section for Rectangular channel and Trapezoidal channel.

- 5.10 Design the most economical rectangular and trapezoidal channel sections for the given conditions.
- 6.1 Define Pump and list different types of Pumps
- 6.2 Describe the parts of Reciprocating Pump with a sketch.
- 6.3 Describe the working principle of Single acting and Double acting reciprocating pumps.
- 6.4 List the functions of air vessels for reciprocating pumps.
- 6.5 Describes the different parts of centrifugal pumps and explain the working principle of centrifugal pump.
- 6.6 Define priming and explain the necessity of priming.
- 6.7 Explain the use of foot valve and strainer in a centrifugal pump.
- 6.8 Define Turbine and list types of turbines.
- 6.9 Differentiate between Impulse and Reaction turbines.
- 6.10 Explain the working principle of Pelton wheel turbine.
- 6.11 Describe the Parts of Francis Turbine.
- 6.12 Explain the purpose of draft tube and list types of draft tubes.
- 6.13 Sketch a typical layout and List different components of hydro-electric power plant installation.
- 6.14 Define surge tank and list the functions of surge tank

Suggested Student Activities

1. To visit a nearby petrol bunk and bike repairing centre and submit a report on pressure measuring devices
2. To carryout market survey for pipes of different sizes and materials available.
3. To assess conditions of water supply mains of your locality and quantify the pressure drop and measuring the actual discharges through various outlets.
4. To visit & submit a report on nearby hydel power plant to know the setup of various components.
5. Student is encouraged to participate in Tech fest/Srujana fest to evolve any novel method of water supply systems
6. Prepare/Download a dynamic animation to illustrate the working principle of hydraulic pumps.

7. Paper/Poster presentation
8. Quiz
9. Group discussion
10. Surprise Test/Slip test

CO-PO Mapping Matrix

	Basic knowledge	Discipline Knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & sustainability	Ethics	Individual and Team work	Communication	Lifelong learning	Linked PO
CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	
CO1	3	1		2				2			1,2,4,8,
CO2		2	1		2	2	2	2			2,3,5,6,7,8
CO3	2	2	1					2	2		1,2,3,8,9
CO4	2	2	1		2	2					1,2,3,5,6,
CO5	1	3	1		2	2					1,2,3,5,6
CO6	1	3	1		2	2				2	1,2,3,5,6,10

Internal Evaluation

Test	Units	Marks
Mid Sem 1	1 and 2	20
Mid Sem 2	3 and 4	20
Slip Test 1	1 and 2	5
Slip Test 2	3 and 4	5
Assignments		5
Seminars		5
	Total	60

QUESTION PAPER PATTERN FOR MID SEMESTER EXAMS

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	4	1	Nil	4 Marks
02	Part-B	Understanding(U)	4	3	2	6 Marks
03	Part-C	Application(A)	4	5	2	10 Marks
Total Marks						20 Marks

MID SEM-I EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-I	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-II	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

MID SEM-II EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-III	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-IV	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

The length of answer for each question framed in respect of Part-A, B&C shall not exceed $\frac{1}{4}$ of a page, 1 page and 2 pages respectively

QUESTION PAPER PATTERN FOR SEMESTER END EXAM

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	8	1	Nil	8 Marks
02	Part-B	Understanding(U)	8	3	4	12 Marks
03	Part-C	Application(A)	8	5	4	20 Marks
Total Marks						40 Marks

Unit No	Questions to be set for SEE				
	R		U	A	
I	Q4	Q1		Q9(a)	Q13(a)
II					
III		Q2		Q10(a)	Q14(a)
IV					
V		Q3	Q5,Q6	Q9(b), Q11(a), Q11(b)	Q13(b), Q15(a), Q15(b)
VI					
Total Questions		8		8	8

State Board of Technical Education and Training, Telangana

**Model Question paper
DCE IV semester
Mid Semester-I Examination**

**Corse Code: 18C-403C
Course Name: HYDRAULICS**

**Duration: 1 hour
Max. Marks: 20 Marks**

PART-A

Answer **all** questions, Each Question carries **one** mark

4x1 = 4 Marks

- 1) Define the term 'specific gravity'
- 2) Define 'absolute pressure'.
- 3) List out any two types of fluid flow.
- 4) Write the mathematical form of Bernoulli's theorem

PART-B

Answer **two** Questions. Each question carries **three** marks

2x 3 = 6 Marks

- 5(a) what is weight density of a fluid giving the values for water and mercury.

(OR)

- 5(b) Compare the centre of pressure and total pressure.

- 6(a) Draw a neat sketch of venturimeter showing its salient features

(OR)

- 6(b) State three assumptions of Bernoulli's theorem

PART-C

Answer **two** questions. Each question carries **five** marks

2x 5 = 10 Marks

- 7(a)** Convert the following vacuum pressures into absolute pressures

- (a) 26cm of mercury
- (b) 11.14 kN/m²
- (c) 0.05 N/mm²
- (d) 0.34 Kgf/cm²

(OR)

- 7(b)** A triangular body of base 2m and height 2.4m is immersed vertically such that the base is parallel to and at a depth of 1.6m from free surface of liquid. Find Total pressure and Centre of pressure.

8(a) Water is flowing through a tapered pipe of length 100m having diameter 600mm at the upper end and 300mm at the lower end at the rate of 50lit/s. The pipe has a slope of 1in30. Find the pressure at the lower end if the pressure at higher end is 0.1962 N/mm^2 .

(OR)

8(b) A venturimeter is to be fitted to a 15 cm diameter pipe which is horizontal where the pressure head is 10m of water. The maximum flow is 9000 litres per minute. Find the diameter of the throat so that the pressure does not become negative. Assume the coefficient of venturimeter as 0.98

State Board of Technical Education and Training, Telangana

**Model Question paper
DCE IV semester
Mid Semester-II Examination**

**Corse Code: 18C-403C
Course Name: HYDRAULICS**

**Duration: 1 hour
Max. Marks: 20 Marks**

PART-A

Answer **all** questions, Each Question carries **one** mark

4x1 = 4 Marks

- 1) Write the relation between C_d , C_c and C_v .
- 2) List any two classification of Mouthpieces based on discharge conditions.
- 3) Define Hydraulic Gradient line.
- 4) Write the formula to calculate the head loss due to pipe friction by Darcy's equation

PART-B

Answer any **two** questions. Each question carries **three** marks

2x 3 = 6 Marks

- 5(a) State three advantages of V-notch

(OR)

- 5(b) Water flows over a rectangular notch 1.25m wide with a head of 0.10m. The same discharge passes through a right angled V notch. Find the head of water in the v-notch.

- 6(a) It was observed that the difference of head between the two ends of a pipe 250m long and 300mm diameter is 1.5m. Taking Darcy coefficient as 0.01 and neglecting minor losses, calculate the discharge flowing through the pipe.

(OR)

- 6(b) A pipe of diameter 90mm is suddenly enlarged to a diameter of 150mm. Find the loss of head due to the enlargement when the quantity of water flowing is $0.072\text{m}^3/\text{sec}$

PART-C

Answer any **two** questions. Each question carries **five** marks

2x 5 = 10 Marks

- 7(a) A jet of water issues from an orifice 1250mm^2 in area under a constant head of 1.125m. It falls vertically 1m before striking the ground at a distance of 2m measured

horizontally from vena-contracta. Calculate hydraulic Co - efficient (C_c , C_d & C_v), if the jet is discharging 3.65 lit/sec.

(OR)

7(b) The catchment area of a tank is 5×10^6 Sq.m. The max rainfall in the catchment is 5 cm per hour. Out of this 80% will reach the tank. Find the length of waste weir if the depth of the water is not to exceed 1 m. The waste weir has to carry piers 1 m wide and 5 m clear span for supporting super structure.

8(a) Water is discharged through a pipe 1220m long which is 40mm in diameter for 610m, and 250mm for the rest of its length. Calculate the flow, taking only friction into account, end of the pipe is 30.5m below the reservoir level. Take $f = 0.004$ for 400mm pipe $f = 0.006$ for the 250mm pipe.

(OR)

8(b) A 2 km long water main has to carry a discharge of $0.54 \text{ m}^3/\text{sec}$. If the maximum allowable loss of head due to friction is 26m, find the diameter of the pipe required. Assume $f=0.008$. Use Darcy's equation neglecting minor losses.

State Board of Technical Education and Training, Telangana
Model Question paper
DCE IV semester
Semester End Examination

Corse Code: 18C-403C
Course Name: HYDRAULICS

Duration: 2 hours
Max. Marks: 40 Marks

PART-A

Answer **all** questions. Each question carries **one** mark.

8x1 = 8 Marks

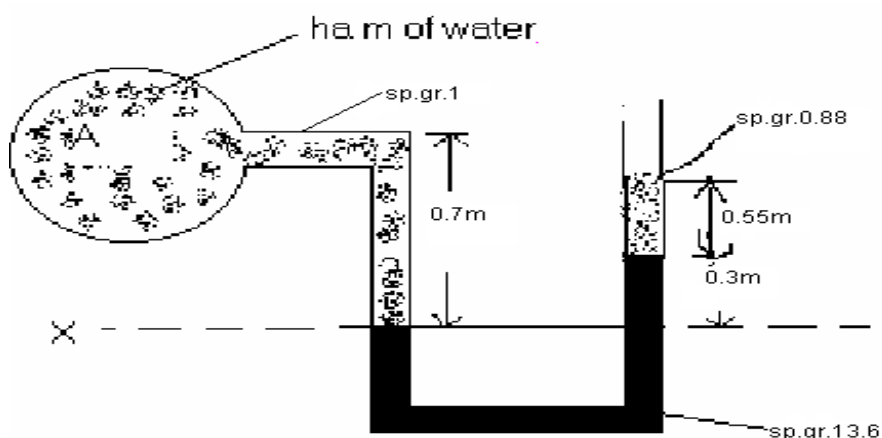
- 1) Define Adhesion.
- 2) List the classification of orifices based on size
- 3) Name the parts of a reciprocating pump?
- 4) State Bernoulli's theorem
- 5) Define steady flow in open channels
- 6) Define the term 'Hydraulic mean depth'
- 7) What is the difference between single – stage and multi – stage pumps?
- 8) What is draft tube?

PART-B

Answer **four** questions. Each Question carries **three** marks

4 x 3 = 12 Marks

9(a) Calculate the pressure at point A in the figure given below



(OR)

9(b) A rectangular channel of having most economical 6.0 m wide. Find the discharge if bed slope is 1 in 1200. Assume C as 50

10(a) A rectangular channel of 1.5m width is used to carry 0.2 m^3 of water. The rate of flow is measured by placing a 90° V- notch weir. If the maximum depth of water is not to exceed 1.2m, find the position of the apex of the notch from the bed of the channel.

(OR)

10(b) List the components of a Hydroelectric power plant

11(a) Find the discharge through a rectangular channel 4 m wide, having depth of water 3 m and bed slope 1 in 1500. Take $N=0.03$ in Kutter's formula.

(OR)

11(b) A trapezoidal channel 5m wide at the bottom and 1.5m deep discharges 1500 l/sec. The side slopes are 2H : 1V. Given N for the channel surface as 0.03, find the longitudinal slope.

12(a) List the component parts of centrifugal pump

(OR)

12(b) Draw a sketch of Reciprocating pump

PART-C

Answer **four** questions. Each Question carries **five** marks

4 x 5 = 20 Marks

13(a) A circular plane of 2m diameter is immersed in water so that its plane makes an angle of 30° and the height point of plane is 1.6 m below the surface. Find the Total pressure and Centre of pressure.

(OR)

13(b) Determine the section of a trapezoidal channel discharging at $30 \text{ m}^3/\text{sec}$, bed slope 1 in 2000 and side slopes as 1.5H : 1V, Chezy's constant is 50.

14(a) A reservoir has been built 4km away from a college campus having 5000 inhabitants. Water is to be supplied from the reservoir to the campus. It is estimated that each inhabitant will consume 200 liters of water per day and that half of the daily supply is pumped within 10hrs. Calculate the size of the supply main, if the loss of head due to friction in pipeline is 20m. Assume 'f' for pipe as 0.008.

(OR)

14(b) Explain the functions of surge tank.

15(a) Find the value of Manning's 'n' in terms of 'C' Chezy's constant

(OR)

15(b) What do you mean by most economical section, write the conditions for trapezoidal section

16(a) Explain the working of reciprocating pump

(OR)

16(b) Briefly write about the important types of draft tube

Department of Technical Education

State Board of Technical Education & Training (TS)

Course Title:	Quantity Surveying	Course Code :	18C-404C
Semester:	IV Semester	Course Group :	Core
Teaching Scheme in Periods(L:T:P):	45:15:0	Credits :	3
Methodology :	Lecture +Tutorials	Total Contact Periods :	60 Periods
CIE :	60 Marks	SEE :	40 Marks

Pre requisites

Knowledge of basic Mathematics, Materials of Construction, Construction practice, reading drawings and plans.

Course Outcomes

Up on completion of the Course, the student will be able to

CO1	Identify different items of works and their units and specifications.
CO2	Prepare approximate and detailed estimates, estimate of quantities of different items of works.
CO3	Prepare data sheets for different items of works and abstract estimate.
CO4	Prepare leads statement, and determine the quantity of earth work by various methods.
CO5	Prepare detailed estimates of Roads and Culverts.
CO6	Prepare detailed estimate for irrigation works.

Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Periods	Questions to be set for SEE				
			R		U	A	
1	Introduction, Units of measurements and Specifications	8	Q4	Q1		Q9A	Q13A
2	Estimates of buildings	12		Q2		Q10A	Q14A
3	Analysis of Rates and Abstract Estimates	12					
4	Earth work calculations	8		Q3		Q9(b),Q11(a), Q11(b)	Q13(b),Q15(a), Q15(b)
5	Detailed estimates of Roads and Culverts	10					
6	Detailed estimates of Public Health Engineering works.	10					
TOTAL		60	8		8	8	

Course Contents

UNIT 1: Introduction, Unit of measurements and Specifications

Duration: 8 Periods(L:6.0 – T:2.0)

- a) Quantity surveying – Definition of estimate – Need for estimation – Types of estimates – Approximate estimate – Detailed estimate – Abstract estimate – Duties of Quantity Surveyor – Elements of a structure – Item of Work – Materials of construction – Line diagram for preparation of abstract estimate
- b) Units of measurements for various items of Civil engineering works as per IS :1200
- c) Degree of accuracy in measurement – Deductions for openings in masonry, RCC and Plastering – Painting coefficients
- d) Specifications – Necessity – Types of specifications – General specifications of:
 - i. Earth works
 - ii. Brick / Stone Masonry with C.M
 - iii. Reinforced Cement Concrete
 - iv. Plastering with C.M
 - v. Floor finishes with ceramic tiles and marbles
 - vi. White washing / Colour washing
- f) Types of estimates – Preliminary or Approximate Estimate – Detailed Estimate– Abstract Estimate – Definitions – Formats for detailed and abstract estimates.
- g) Preliminary or Approximate Estimate – Plinth area method – Cubic rate method – Service Unit method
- h) Problems in Preliminary estimate

UNIT 2: Estimates of Buildings

Duration: 12 Periods(L:9.0 – T:3.0)

Different Methods of taking out quantities – Centre Line Method – Long and Short Wall Method- Quantities of items in different components of buildings- Preparation of detailed estimates for buildings with load bearing walls and framed structure.

- a) Single Room Building
- b) Single Room with Verandah
- c) Single storied Residential building with two bed rooms (2 BHK)
- d) Two storied residential building
- e) Buildings with Sloped roofs like pitched roof, lean to roof, hipped & valley roof

UNIT 3: Analysis of Rates and Abstract Estimates**Duration: 12 Periods(L:9.0 – T:3.0)**

- a) Analysis of Rates-Definition and Purpose
- b) Standard Data Book, SSR, Standard data sheet
- a) Cost of materials at source and at site
- b) Standard Schedule of Rates of different materials in buildings works
- c) Types of labour – Wages as per S S R
- d) Lead and Lift – Preparation of Lead Statement
- e) Data Sheets – Standard data for materials and labour components for different items of work
- f) Preparation of unit rates for finished items of works using Standard data and S S R
- g) Methods of calculating quantities of ingredients of various proportions of cement mortar and cement concrete.
- h) Provisions for different building services and other overhead charges
- i) Prepare abstract estimate for:
 - i. Single bedroom building (1 BHK)
 - ii. Two bedroom building with veranda (2 BHK)

UNIT 4: Earth Work Calculations**Duration: 8 Periods(L:6.0 – T:2.0)**

- a) Lead and Lift – Initial and subsequent values-Standard values
- b) Mid- sectional Area Method – Mean Sectional Area Method – Trapezoidal Rule – Prismoidal Rule for computing volumes in level sections for roads and Canals and their limitations
- c) Taking out quantities from Longitudinal Section and Cross Section in cutting and embankment of level sections –Calculation of Areas
- d) Capacity of Reservoir from the table of areas and contours

UNIT 5: Detailed Estimates of Roads and Culverts**Duration: 10 Periods(L:7.5 – T:2.5)**

- a) Gravel Road
- b) Water bound macadam road
- c) Cement concrete road
- d) Pipe culvert
- e) R C C slab culvert with straight returns

UNIT 6: Detailed Estimates of Public Health Engineering works**Duration: 10 Periods(L:7.5 – T:2.5)**

- a) Open well with masonry staining
- b) R C Over head tank
- c) Septic tank and soak pit

Reference Books

1. Estimating and Costing - B.N. Dutta
2. Estimating and Costing - S. C. Rangawala

Suggested E-learning references

1. <http://nptel.ac.in>
2. <https://www.youtube.com/watch?v=1JdAPaDHueM>
3. <https://www.youtube.com/watch?v=F4KQoqlDLaY>
4. <https://www.youtube.com/watch?v=ndgThVc6vMs>

Suggested Learning Outcomes

Upon completion of the course, the student shall be able to

- 1.1 Define:
 - a) Quantity Surveying
 - b) Estimate
- 1.2 State the need for quantity surveying
- 1.3 Identify different types of estimates
- 1.4 Explain the need for different estimates
- 1.5 Distinguish among element of structure, item of a work & materials of Construction
- 1.6 List the duties of Quantity Surveyor
- 1.7 State the units of measurements, data and payment for different items of work and materials using IS : 1200
- 1.8 State the types of taking out measurement.
- 1.9 Explain the process of taking measurements for different works and tolerances
- 1.10 Define specifications
- 1.11 State the need for specifications
- 1.12 State different types of specifications
- 1.13 Give the general specifications for important items of work
- 1.15 State different types of estimates

- 1.16 Explain:
- a) Approximate or preliminary estimate
 - b) Detailed estimate
 - c) Abstract estimate
- 1.17 State the methods of preparing approximate estimates
- 1.18 Explain:
- a) Plinth area method
 - b) Cubic content method
 - c) Service unit method or unit cost method
- 1.19 Prepare approximate estimates for residential and non-residential buildings with given data of size / capacity and rates considering Cost of building services and other over heads
- 2.1 Differentiate between detailed estimate and abstract estimate
- 2.2 Write formats of detailed estimate and abstract estimate
- 2.3 State the information required for preparation of detailed estimates of a building
- 2.4 State and explain different methods of taking out quantities
- 2.5 Explain Centre Line Method – Long and Short Wall Method
- 2.6 Prepare the detailed estimates for various buildings (load bearing and framed) from the given Drawings, specifications and site conditions:
- a) Single Room Building
 - b) Single Room with Verandah
 - c) Single storied Residential building with two bed rooms (2 BHK)
 - d) Two storied residential building
 - e) Buildings with Sloped roofs like pitched roof, lean to roof, hipped & valley roof
- 3.1 Define analysis of rates
- 3.2 Explain the purpose of analysis of rates
- 3.3 Explain the following in rate analysis:
- a) Standard data book
 - b) Standard schedule of rates
 - c) Standard data sheet
- 3.4 Explain cost of material at source
- 3.5 Explain cost of material at site
- 3.6 Explain the following terms:
- a) Blasting charges
 - b) Seignorage charges

- c) Cess charges
 - d) Stacking charges
 - e) Water charges
 - f) Crushing charges
 - g) Lead charges
- 3.7 Compute rate of an item of work
- 3.8 Explain different types of labor wages as per latest SSR
- 3.9 Define lead statement
- 3.10 Prepare the format for Lead Statement
- 3.11 Prepare Lead Statement and data for different items of work
- 3.12 Prepare the unit rates for finished items of works using standard data and SSR
- 3.13 Tabulate the material requirement of mortars and concrete of different proportions
- 3.14 Prepare abstract estimate for the following buildings:
 - a) Single bedroom building (1 BHK)
 - b) Two bedroom building with veranda (2 BHK)
- 4.1 Explain terms: embankment, cutting
- 4.2 Define: lead and lift
- 4.3 State the standard values of Lead and Lift
- 4.4 Calculate the lead and lift for a given section
- 4.5 List different methods of computing the areas and volumes
- 4.6 Explain:
 - a) Mean sectional area method
 - b) Mid sectional area method
 - c) Trapezoidal rule
 - d) Prismoidal rule
- 4.7 State the limitations of prismoidal rule
- 4.8 Determine the areas of an embankment for a given data
- 4.9 Determine the areas of a cutting for a given data
- 4.10 Prepare detailed estimates for earth work for roads, canals and earthen bunds
- 4.11 Compute gross and effective capacity of a reservoir from the areas of different contours
- 5.1 Prepare a detailed estimate for different types of roads and culverts.
 - a) Gravel road
 - b) Water bound macadam road
 - c) Cement concrete road
 - d) Pipe culvert
 - e) Slab culvert.

5.2 State the items involved in the abstract estimates of roads and culverts.

6.1 Prepare a detailed estimate for the following items:

- a) Open well
- b) R.C.C. overhead tank
- c) Septic tank with soak pit

6.2 State the items to be included in the abstract estimates of above structures

Suggested Student Activities

- 1) The topic should be related to the course in order to enhance his knowledge, practical skill & and lifelong learning, communication, modern tool usage.
- 2) Prepare Check list for different items of following type of Civil Engineering works.
 - a. Load Bearing Building Structure.
 - b. Framed structure type of building
 - c. W.B.M.Road
 - d. Septic Tank
 - e. Community well
- 3) Writing the rules of deduction of openings for below mentioned items of work as per IS1200.
 - a. Brick / Stone masonry
 - b. Plastering / Pointing
- 4) Preparing detailed estimate of a RCC single & two storied existing residential building for all items of work.
- 5) Prepare the lead statement for earth work excavation for a Road.
- 6) Prepare the lead and lift statement for a building.
- 7) Collect the market data for cost of construction materials and implement in rate analysis and compare it with the SR book.
- 8) Rate analysis to be done for construction activities by using alternate materials like M-sand for River sand and analyse the difference of rates.
- 9) Rate analysis for works under Lump sum (LS) head to be studied in detail and compared with present SR.
- 10) Reconciliation of materials for a particular item need to be done for an ongoing project.
- 11) Detailed estimate for any two or more residential buildings to be compared and rate per unit area to be found out which will help in present market survey.

CO-PO Mapping Matrix

	Basic knowledge	Discipline Knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & sustainability	Ethics	Individual and Team work	Communication	Lifelong learning	Linked PO
CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	
CO1	3	1	1		1		2				1,2,3,5,7
CO2	3	1	1	1	2		2			2	1,2,3,4,5,7,10
CO3	3	2		1	2		2				1,2,4,5,7
CO4	2	2	2	1	2		2			2	1,2,3,4,5,7,10
CO5	2	3	2	1	3	2	2			2	1,2,3,4,5,6,7,10
CO6	1	3	3	1	3	2	2			2	1,2,3,4,5,6,7,10

Internal Evaluation

Test	Units	Marks
Mid Sem 1	1 and 2	20
Mid Sem 2	3 and 4	20
Slip Test 1	1 and 2	5
Slip Test 2	3 and 4	5
Assignments		5
Seminars		5
	Total	60

QUESTION PAPER PATTERN FOR MID SEMESTER EXAMS

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	4	1	Nil	4 Marks
02	Part-B	Understanding(U)	4	3	2	6 Marks
03	Part-C	Application(A)	4	5	2	10 Marks
Total Marks						20 Marks

MID SEM-I EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-I	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-II	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

MID SEM-II EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-III	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-IV	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

The length of answer for each question framed in respect of Part-A, B&C shall not exceed ¼ of a page, 1 page and 2 pages respectively

QUESTION PAPER PATTERN FOR SEMESTER END EXAM

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	8	1	Nil	8 Marks
02	Part-B	Understanding(U)	8	3	4	12 Marks
03	Part-C	Application(A)	8	5	4	20 Marks
Total Marks						40 Marks

Unit No	Questions to be set for SEE				
	R		U		A
I	Q4	Q1		Q9(a)	Q13(a)
II					
III		Q2		Q10(a)	Q14(a)
IV					
V		Q3	Q5,Q6	Q9(b), Q11(a), Q11(b)	Q13(b), Q15(a), Q15(b)
VI					
Total Questions	8		8	8	

State Board of Technical Education and Training, Telangana

Model Question paper

DCE IV semester

Mid Semester-I Examination

Corse Code:18C-404C

Duration:1 hour

Course Name: Quantity Surveying

Max.Marks:20 Marks

PART-A

Answer all questions, Each Question carries one mark.**4x1 = 4 Marks**

1. What is estimation?
2. write the units for the quantities of a) brick masonry.b) plastering.
3. Write the methods of taking out quantities for buildings.
4. Write the table form for detailed estimate.

PART- B

Answer **two questions** .Each question carries **three** marks

2x3=6 marks

- 5.(a). Write the duties of a quantity surveyor.

(OR)

- 5.(b) Write different types of estimates.

- 6(a). A single roomed building is having 3.6m x 6.0 m internal dimensions with 300mm thick wall and height of the room is 2.3 m. Calculate quantity of brick work without deductions.

(OR)

- 6(b) A compound wall of 1m height and 300mm thick has a foundation of 50mm projection on both sides and 150mm thick. Find the quantity of foundation material for 1m length.

PART-C

Answer **two questions** .Each question carries **five** marks

2x5=10 Marks

- 7(a) Prepare a plinth area estimate of a building with a total plinth area of 240m^2 .from the following data

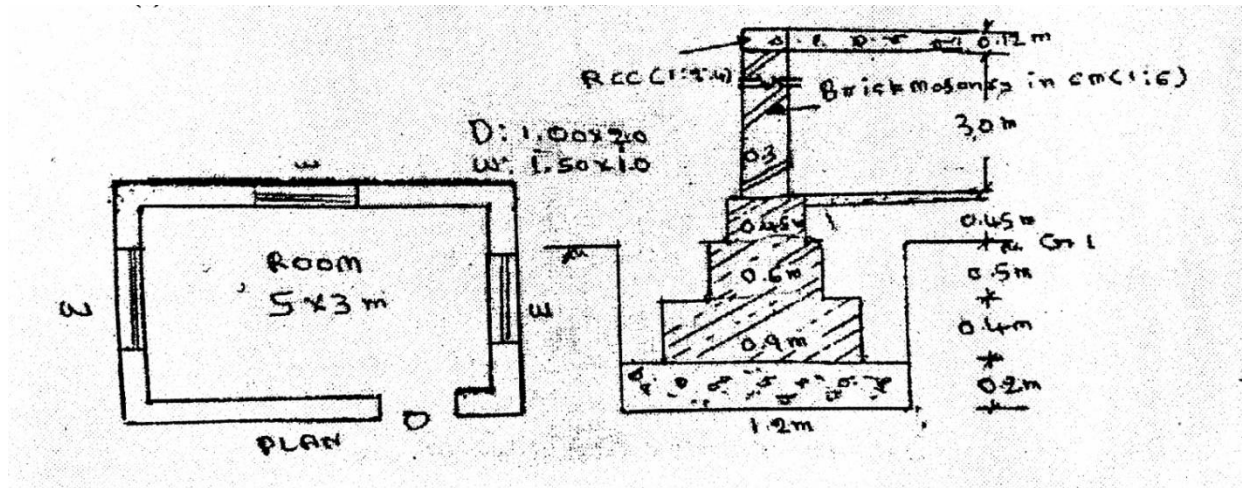
- i) Plinth are rate Rs $9000/\text{m}^2$.
- ii) Electrical installations = 14% of the building cost
- iii) water supply and sanitary installations =5%
- iv) contingencies = 3%

(OR)

- 7(b). Explain different methods of approximate estimate.

8(a) Prepare the detailed estimate the following items of works for the fig.

- Earth work excavation
- CC bed for the foundation



(OR)

8(b). Prepare the detailed estimate for the following items of works for above fig

- Brick masonry for the basement
- Brick masonry for super structure with deductions

State Board of Technical Education and Training, Telangana
Model Question paper
DCE IV semester
Mid Semester-II Examination

Corse Code: 18C-404C
Course Name: Quantity Surveying

Duration: 1 hour
Max.Marks: 20 Marks

PART-A

Answer **all** questions. Each question carries **one** mark **4x1 = 4 Marks**

1. Write the format for lead statement.
2. What is cost of material at source and cost of material at site.
3. Define the terms lead and lift .
4. State any two methods of calculation of volume of earth work.

PART- B

Answer **two questions** .Each question carries **three** marks **2x3=6 Marks**

- 5.(a) Calculate the cement quantity in concrete 1:1.5:3 for 10 m³.

(OR)

- 5.(b). Find the cost of material at site for the following.

sno	materials	Rate at source	lead	Conveyance charges
1	40 mm HBG metal	Rs 300/m ³	10 km	15/ km/m ³
2	sand	Rs 75/m ³	20 km	10/km/m ³
3	Rough stone	Rs 250/m ³	8 km	12/km/m ³

- 6.(a) Find the area of embankment, if the top width of the road is 6m and depth is 3m. The side slopes are 2:1.

(OR)

- 6(b). Calculate the quantity of earth work for 1km length for a portion of the road in a uniform ground the heights of banks at the two ends being 1m and 1.5m. The formation width is 10m and side slopes are 2H:1V.

PART-C

Answer **two questions** .Each question carries **five marks**

2x5=10 Marks

7(a). Calculate the quantity of materials required to prepare the following items of works

A) 12 m^3 of cc 1:3:6.

B) 20 m^3 of brick masonry CM 1:6.

(OR)

7.(b).

Prepare the data sheet and calculate the cost of the items given below :

- (a) C.C. (1:5:10) using 40 mm HBG metal - unit 1 cu.m.
- | | |
|---------------------|-----------------|
| 0.92 m ³ | 40 mm HBG metal |
| 0.46 | Sand |
| 0.23 | Cement |
| 0.06 Nos. | Mason I |
| 0.14 Nos. | Mason II class |
| 1.80 Nos. | Man Mazdoor |
| 1.40 Nos. | Women Mazdoor |
| L.S. | Sundries |
- (b) R.R. Stone masonry in C.M. (1:6) - 1 cu.m.
- | | |
|------------|-----------------------------|
| 1.05 cu.m. | Rough stone |
| 0.05 cu.m. | Bond stone |
| 0.34 cu.m. | C.M. (1:6) |
| 0.54 cu.m. | Mason 1 st class |
| 1.20 Nos. | Mason 2 nd class |
| 1.40 Nos. | Man Mazdoor |
| 1.40 Nos. | Women Mazdoor |
| LS | Sundries |

Rates of labour and materials at site :	
HBG 40 mm size	= Rs. 440.00 / 1 cu.m.
Sand	= Rs. 200.00 / 1 cu.m.
Cement	= Rs. 3400.00 / 1 cu.m.
Rough stone	= Rs. 280.00 / 1 cu.m.
Bond stone	= Rs. 700.00 / cu.m.
Mason 1 st Class	= Rs. 160.00
Mason 2 nd Class	= Rs. 140.00
Man Mazdoor	= Rs. 110.00
Women Mazdoor	= Rs. 110.00
Mixing charges for C.M.	= Rs. 20.00 / cu.m.
Mixing charges for C.C.	= Rs. 30.00 / cu.m.

8(a). Calculate the quantity of earthwork for 8 chains length (30M) for a portion of a road embankment on a level ground having 10.5m formation width and 2:1 side slopes .The level difference between formation and ground level is 0.9m, 0.7m, 1.20m, 3.4m, 2.90m, 3.10m, 3.40m, 2.60m and 2.40m respectively. Use Trapezoidal method.

(OR)

8.(b) .For the above problem find the quantity of earthwork in Prismoidal method.

State Board of Technical Education and Training, Telangana
Model Question paper
DCE IV Semester
Semester End Examination

Corse Code:18C-404C
Course Name: Quantity Surveying

Duration:2 hours
Max.Marks:40 Marks

PART-A

Answer **all** questions. Each question carries **one** mark **8x1 = 8 Marks**

1. State the units for the following items a) plain CC in foundation) b) plastering
2. Write the purpose of rate analysis.
3. Write the formula for finding the quantity of RCC for Trapezoidal portion of a column foundation.
4. A room internal dimensions are 4mx3m the wall thickness in super structure is 300mm.calculate the centre line length.
5. Cement concrete pavement 100mm thick and 7.5m wide is laid over a base course 75 mm for a length of 5m.find the quantity of CC required for pavement.
6. Write the units for the measurement of a) Dry stone pitching b) plastering for abutment wall.
7. How do you calculate the quantity of earthwork refilling in open well.
8. What are the deductions that you will make while calculating quantity for plastering in a septic tank.

PART-B

Answer four questions. Each question carries three marks

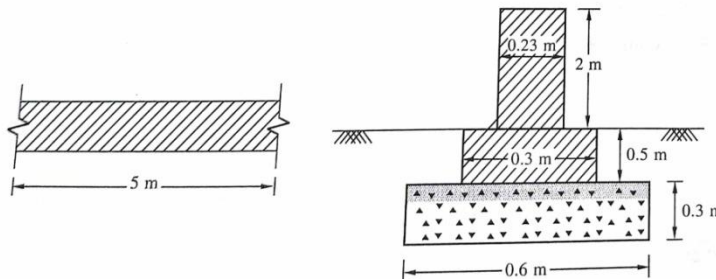
4x3=12 marks

9.a).

Fig. 4.5, shows the plan and section of a part of a compound wall calculate the quantity of

(a) Cement concrete required for foundations

(b) Brick masonry required for footing & wall

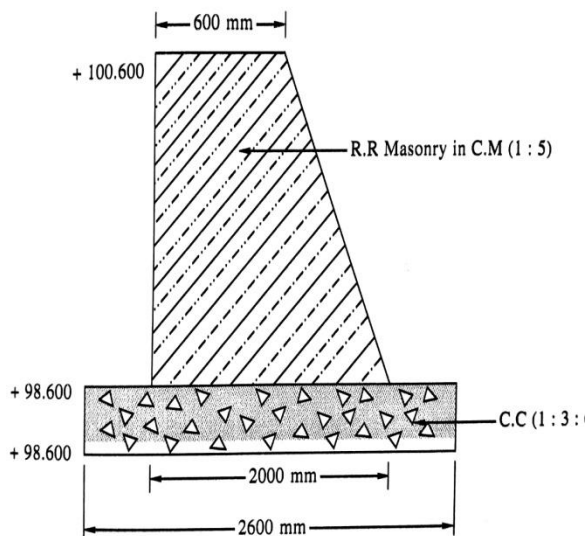


(OR)

9.b). Calculate the following quantities for an abutment wall shown in fig. take the length of wall as 5m.

a) CC bed under abutment

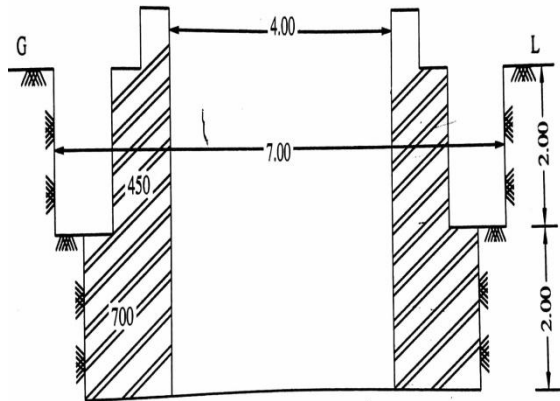
b) Masonry used in abutment.



10(a). Write the formulas for trapezoidal rule and prismoidal rule for finding earth work quantities.

(OR)

10(b). The cross section of a circular well is shown in the fig. Calculate the quantity of earth work excavation.

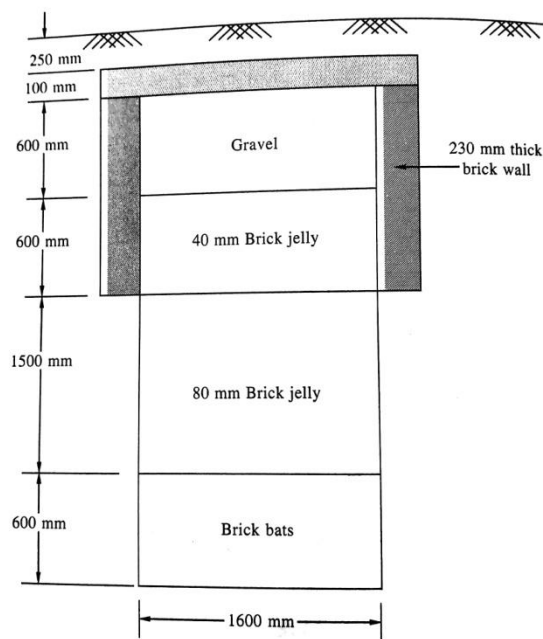


11(a). Find the area of embankment, if the top width of the road is 6m and depth is 3m. The side slopes are 2:1.

(OR)

11(b) Write the items of works and their units in the estimation of a WBM road.

12(a). The cross section of a dispersion trench is 1.6m dia is shown in fig. Calculate the quantity of brick masonry for the side walls.



(OR)

12(b) The size of a over head tank is 4.5mx 4.5m with side walls 200mm thick. Calculate the quantity of RCC for a base slab if the thickness is 100mm.

PART-C

Answer any 4 questions. Each question carries five marks

4x5=20 marks

13.a).

Prepare an approximate of building project with total plinth area of building is 600 m². From the following data calculate the total cost of the project.

- (a) Plinth area rate Rs. 12000/- per Sq. m*
- (b) Cost of water supply @ $7\frac{1}{2}$ % of cost of building.*
- (c) Cost of sanitary and electrical installations each $7\frac{1}{2}$ % of cost of building.*
- (d) Cost of architectural features 1 % of building cost.*
- (e) Cost of roads and lawns @ 5 % of building cost.*
- (f) Cost of P.S and contingencies @ 4 % of building cost.*

(OR)

13(b) For an embankment 60m long of uniform gradient when the height of bank is 3m at one end and 1.8m at the other .The width of embankment at top is 6m and its side slopes are 1.5:1 . Estimate the quantity of earth work by

- a) Mid sectional area method b) Prismoidal method.

14.(a). Calculate the quantity of cement required in bags for following items of works:

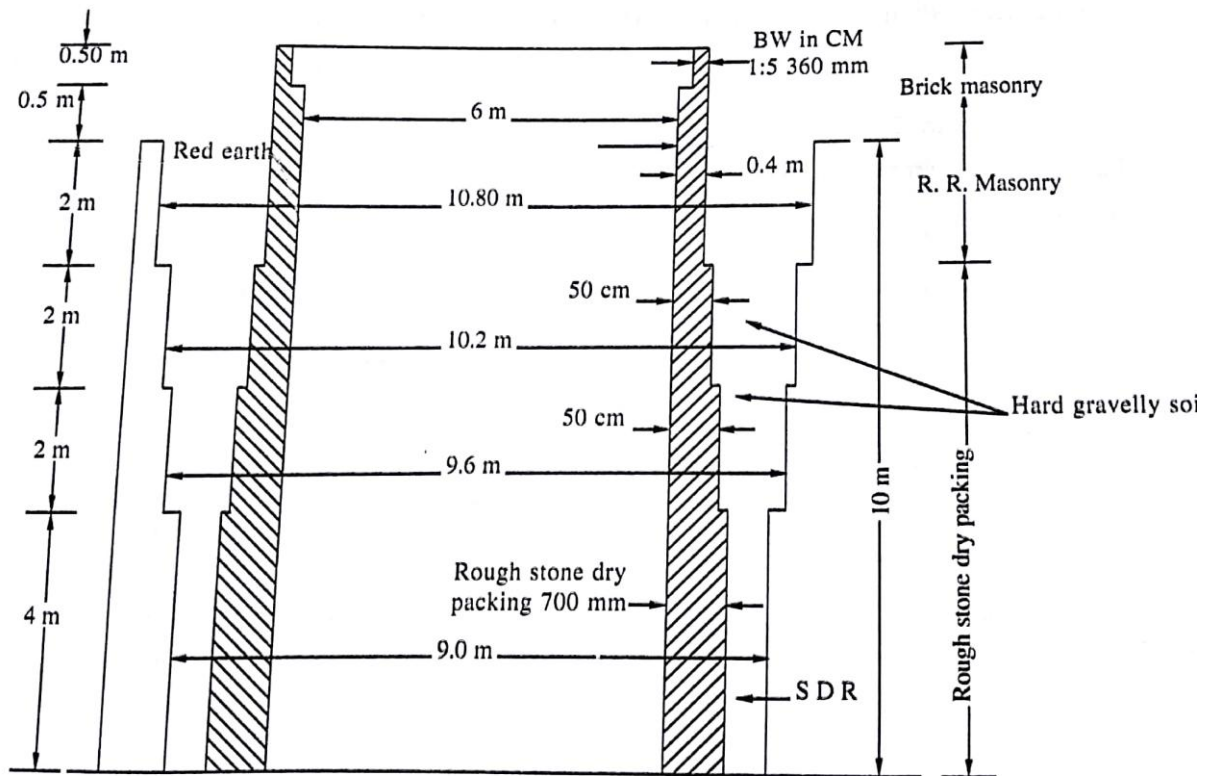
- a) CRS masonry in CM 1:6 using granite stone for 15 m³ of work if 0.32 m³ CM is required for 1 m³.
- b) Plastering with CM 1:4 12mm thick for 100 m² of work if 0.15 m³ of CM is required for 10m² of plastering.

(OR)

14.b).

Prepare detailed estimate of open well of drawing

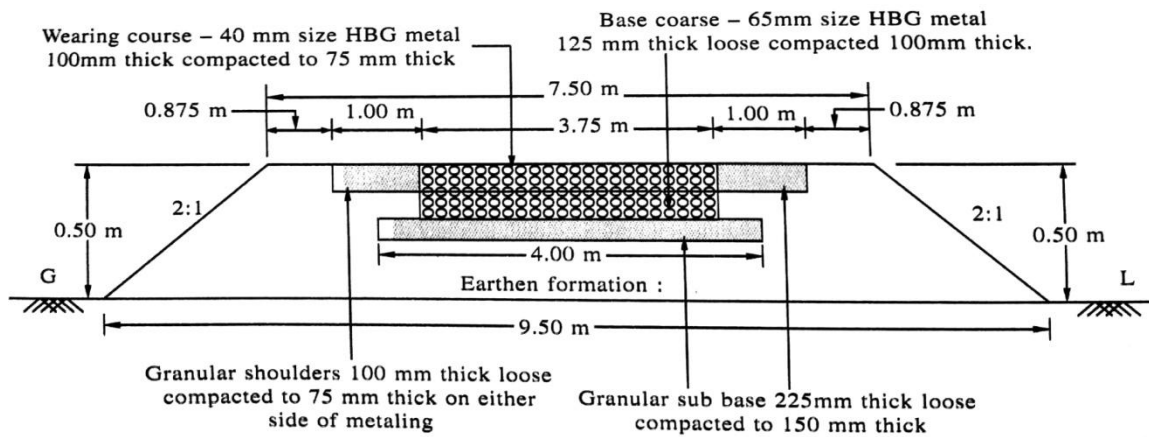
- (i) *Earth work excavation*
- (ii) *Rough stone dry packing*
- (iii) *R.R. masonry in C.M. (1:6)*



15.a).

Prepare the detailed estimate for the water bound macadam (WBM) road of length 1.50 Km with the details shown in Fig. 8.6 for the following items of work.

- (a) Earth work for formation
- (b) Granular sub base
- (c) Base course with 65 mm size HBG metal.



(OR)

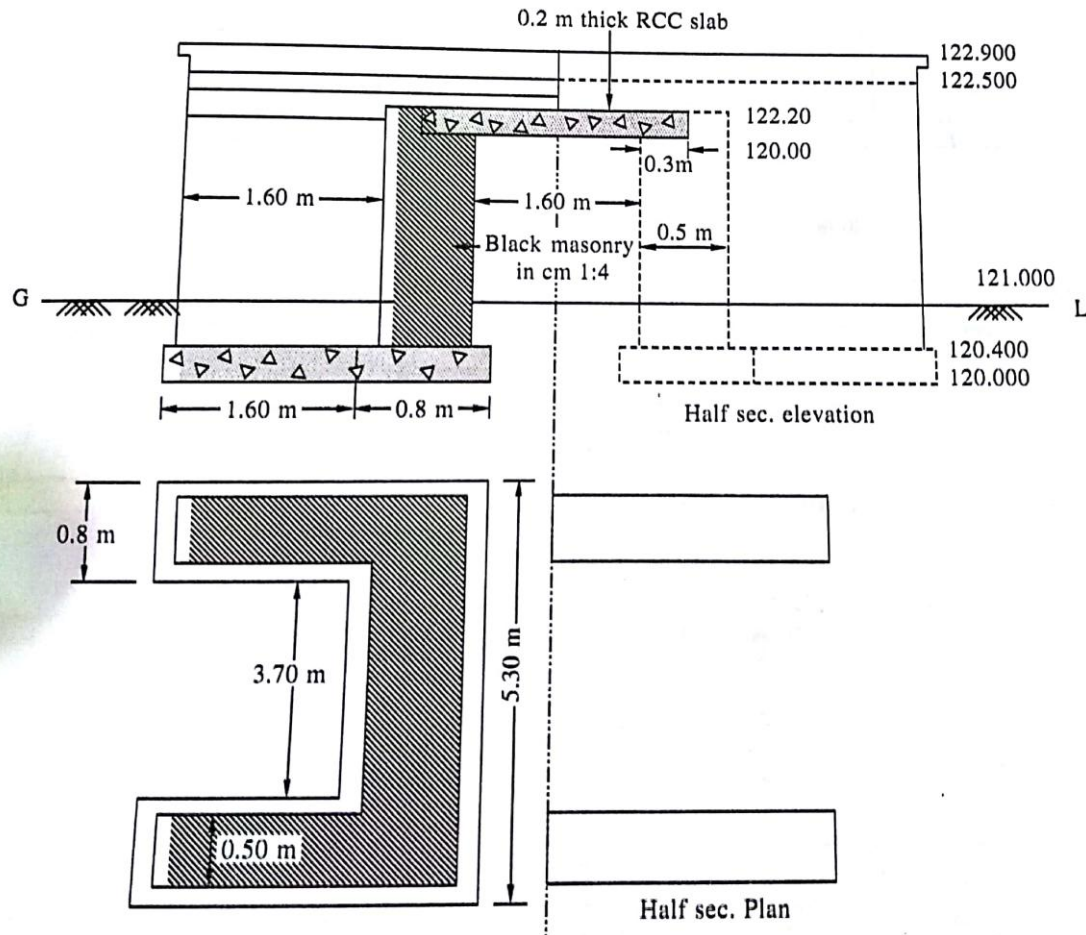
15.b).

Prepare the detailed estimate of following items of work from drawing of R.C.C. slab culvert.

(a) C.C. bed (1:4:8) for foundation under abutment and returns.

(b) R.R. masonry for abutment and returns

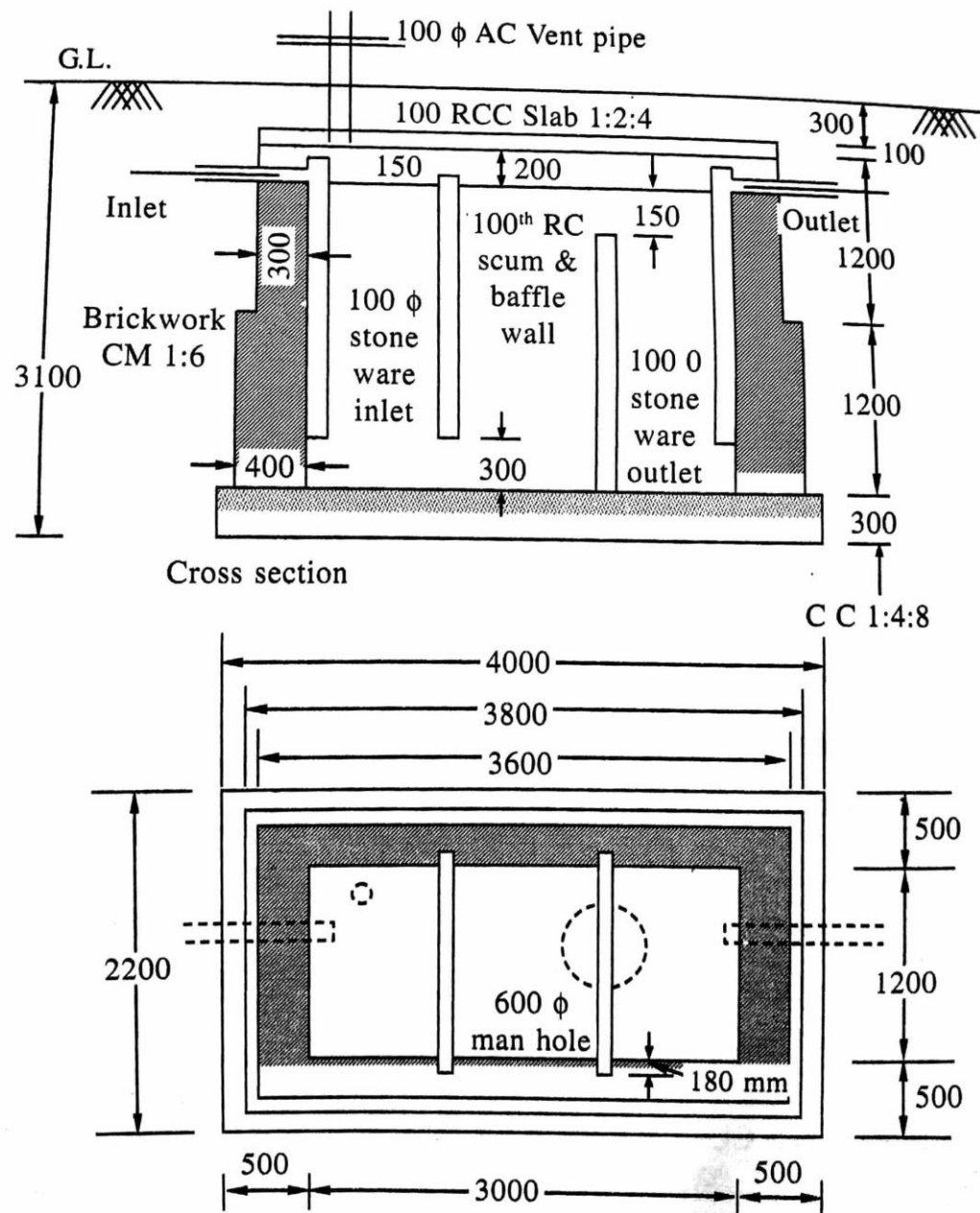
(c) R.C.C. (1:2:4) deck slab for vent way.



16.a).

Calculate the following quantities of a septic tank in the Fig. 5.21.

- (a) C.C. (1:4:8) under septic tank
- (b) Brick masonry in CM (1:5) for side walls
- (c) R.C.C. (1:2:4) for roof cover, scum board and baffle wall.



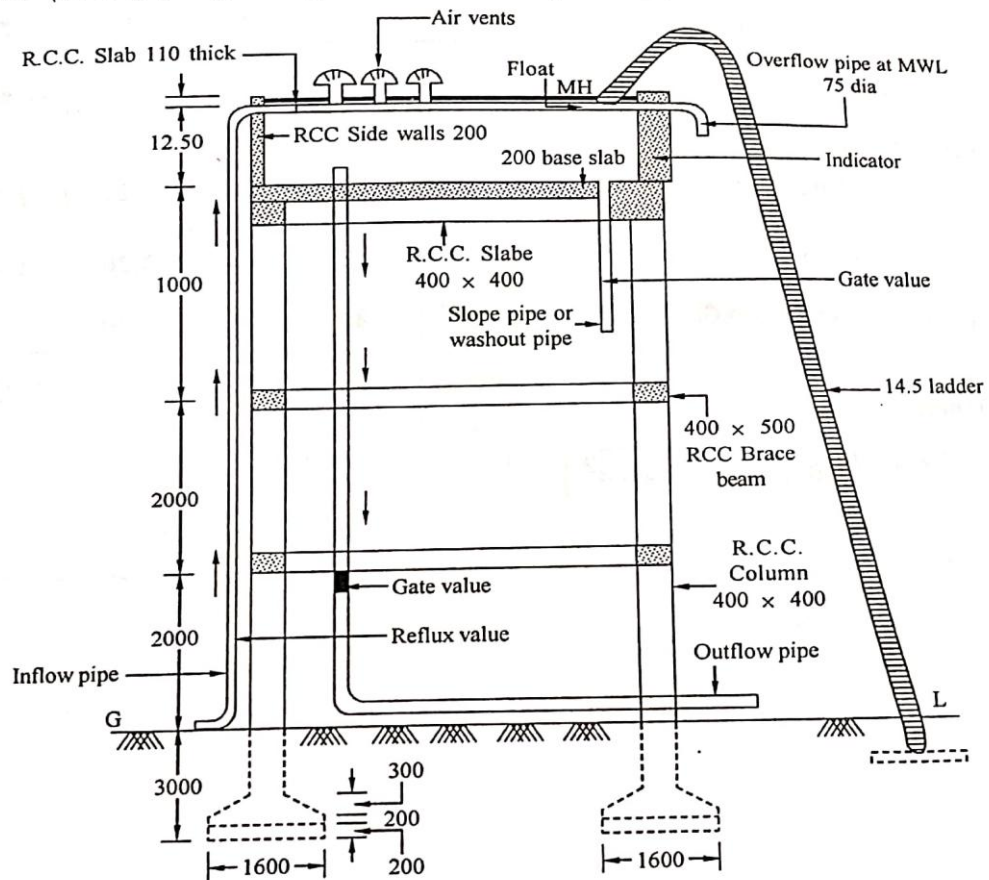
(OR)

16.b)

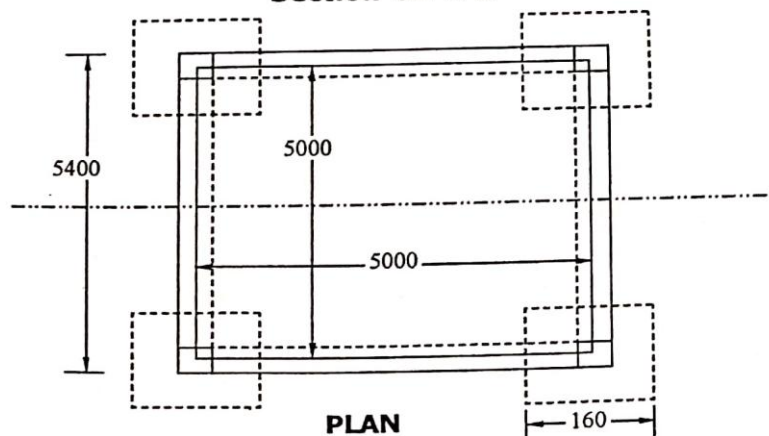
Prepare a detailed estimate of following items of work for an over head tank shown in Fig. 8.24.

(a) Earth work excavation for foundation.

(b) R.C.C. (1:2:4) for footing and columns upto G.L.



Section on X-X



Department of Technical Education

State Board of Technical Education & Training (TS)

Course Title:	Irrigation Engineering	Course Code :	18C-405C
Semester:	IV Semester	Course Group :	Core
Teaching Scheme in Periods(L:T:P):	45:15:0	Credits :	3
Type of Course :	Lecture+Assignments	Total Contact periods :	60
CIE :	60 Marks	SEE :	40 Marks

Pre requisites

The student should know the basic knowledge about hydraulics and mechanics.

Course Outcomes

On completion of this course, the student will be able to

CO1	Solve simple problems of irrigation by applying basic principles and methods.
CO2	Estimate rainfall over a catchment by various methods.
CO3	Explain different parts of head works and weirs and their functions.
CO4	Explain the structural details and construction and maintenance of gravity and earth dams.
CO5	Summarize the data of canals and maintenance of canals, and cross drainage works.
CO6	Develop the concept of water shed and its objectives and maintenance, explain about water conservation .

Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Periods	Questions to be set for SEE			
			R		U	A
1	Basics of Irrigation	12	Q4	Q1	Q9(a)	Q13(a)
2	Basics of Hydrology	08				
3	Head works and weirs	08		Q2	Q10(a)	Q14(a)
4	Gravity dams and Earth dams	12				
5	Distribution works	10	Q3	Q5,Q6	Q9(b), Q11(a), Q11(b)	Q13(b), Q15(a), Q15(b)
6	Watershed Management	10		Q7,Q8	Q10(b), Q12(a), Q12(b)	Q14(b), Q16(a), Q16(b)
Total		60	8		8	8

Course Contents

UNIT – 1: Basics of Irrigation

Duration:12 Periods(L:9.0 – T:3.0)

- a) Introduction-Definitions-necessity and scope of irrigation-advantages and disadvantages- perennial and inundation irrigation-flow and lift irrigation-direct and storage irrigation- Methods of irrigation- Border Strip, Furrow, Check basin, Sprinkler & Drip irrigation

- b) Principal crop seasons-kharif and Rabi crops.
- c) Definition of duty, delta, base period, crop period, kor period -different methods of expressing duty-relationship between duty and delta and base period-factors affecting duty —duty figures for principal crops-simple problems.

UNIT - 2: Basics of Hydrology

Duration:8 Periods(L:6.0 – T:2.0)

- a) Introduction-Definition of Precipitation, Runoff, Runoff classification-Rainfall-Catchment and its types-Factors affecting run off.
- b) Types of rain gauges-Simon's rain gauge-float type automatic recording gauge-Precautions in setting and maintenance-rainfall records Hydrological cycle-average annual rainfall of an area – Theissen's polygon method.
- c) River gauging-objectives –selection of site-list the methods to measure the velocity.

UNIT - 3: Head Works and Weirs

Duration: 8 Periods(L:6.0 – T:2.0)

- a) Introduction-Classification of head works-storage and diversion, head works- their suitability under different conditions-suitable site for diversion works-general layout of diversion works-brief description of component parts of diversion works,
- b) Barrages and Weirs - Brief description of component parts of a weir-percolation-uplift-creep-scour-effect of percolation-list the protective works for a river weir.

UNIT – 4: Gravity dams and Earth dams

Duration: 12 Periods (L:9.0 – T:3.0)

- a) Introduction-Reservoirs and its types-Dams and its functions-types -Factors influencing selection of site for reservoirs and dams.
- b) Gravity dams- Definition of various terms such as FRL, MWL, TBL, free board, Dead Storage, Live Storage, Gravity Dam, Spillway-profile of a dam-forces acting - Causes of Failures and remedial measures -Elementary profile -low dam and high dam - free board and top width –sketch the practical profile.
- c) Uplift pressure - drainage gallery-spillway-types of spillways and their suitability.
- d) Earth dams – locations suitable for Earth Dams, types of earth dams- saturation gradient and phreatic line-Causes of failure of earth dams and remedial measures.

UNIT 5: Distribution works

Duration: 10 Periods(L:7.5– T:2.5)

- a) Introduction-Canals-importance of Irrigation canals- classification-different methods of canal alignment-typical cross section of canal in cutting embankment, partial cutting and embankment – berms – standard dimensions - balancing depth of cutting-functions of head regulator and cross regulator -canal lining-necessity- types – advantages and disadvantages-maintenance of canals.
- b) Cross drainage works-necessity and suitability –general description of aqueducts – super passage -siphon-level crossing.

UNIT – 6: Watershed Management

Duration: 10 Periods (L:7.5 – T:2.5)

- a) Introduction- concept of watershed development, objectives of watershed Management, need for watershed development in India-Characteristics of Watershed: size, shape, physiography, slope, climate, drainage, land use, vegetation, geology and soils, hydrology and hydrogeology, socio-economic characteristics- factors affecting watershed management - causes of watershed deterioration and their result-watershed management practices
- b) Water Harvesting: Rainwater harvesting, soil moisture conservation, check dams, artificial recharge, and percolation tanks.
- c) Soil erosion-Types and causes of erosion, factors affecting erosion, measures to control erosion,-ploughing-trenching-bunding-terracing-check dams-rock fill dams.

Reference Books

1. Irrigation Engineering by B.R.Gupta.
2. Irrigation Engineering by B.CPunmia
3. Irrigation Engineering and water power engineering by Birdie.
4. Irrigation Engineering by S.K.Garg
5. Watershed Management by JVS Murthy, - New Age International
6. Land and Water Management by VVN Murthy, -Kalyani Publications

Suggested E-learning references

1. <http://nptel.ac.in>

Suggested Learning Outcomes

Upon completion of the course, the student shall be able to

- 1.1 Define Irrigation
- 1.2 State the necessity of irrigation.
- 1.3 List advantages and disadvantages of irrigation.
- 1.4 Distinguish between
 - i) Perennial and inundation irrigation.
 - ii) Flow and Lift irrigation.
 - iii) Storage and direct irrigation.
- 1.5 Briefly describe various methods of Irrigation
- 1.6 State Principal crops in India and their seasons.
- 1.7 State different methods of expressing duty.
- 1.8 State the relationship between duty and delta.
- 1.9 State the factors affecting duty.
- 2.1 Define terms Catchment, intercepted catchment, free catchment, runoff, max flood discharge.

- 2.2 State the methods of measuring rainfall with Simon's rain gauge.
- 2.3 State the characteristics of good, average and bad catchments.
- 2.4 State the factors affecting run-off.
- 2.5 State the objectives for river gauging.
- 2.6 List the factors for selecting suitable site for a gauging station
- 3.1 State the classification of head works and their suitability under different conditions.
- 3.2 List the factors suitable for selection of site of Diversion works.
- 3.3 Describe with sketch the component parts of Diversion works.
- 3.4 Distinguish between barrages and Weirs
- 3.5 Describes with sketch the component parts of a weir and their functions.
- 3.6 Explain the terms percolation, uplift, creep and scour.
- 4.1 State the classification of Dams.
- 4.2 State factors influencing selection of site for reservoirs and dams.
- 4.3 Define the terms: Full reservoir level. Maximum water level, top bund level, dead storage, live storage, free board, gravity dam, spillway.
- 4.4 Briefly explain the causes of failure of gravity dams and their remedies.
- 4.5 Distinguish between low and high dams.
- 4.6 Draw the elementary profile of a gravity dam for a given height
- 4.7 Draw the practical profile of a low dam.
- 4.8 State need of drainage galleries
- 4.9 State the different types of spillways and their suitability and draw sketches
- 4.10 State the situations in which earth dams are suitable.
- 4.11 Define saturation gradient, phreatic line.
- 4.12 State the three types of earth dams with sketches of typical cross sections.
- 4.13 Briefly explain the causes of failure of earth dams and states the remedial measures.
- 5.1 Explain the importance of Irrigation canals.
- 5.2 State classifications of canals.
- 5.3 State the different methods of canal alignment and the situations in which each is suitable.
- 5.4 Sketch typical cross sections of canals in cutting, embankment and partial cutting.
- 5.5 Define terms: balancing depth of cutting.
- 5.6 State the functions of Head Regulator and cross regulator.
- 5.7 State the need and draws the sketches of different cross drainage structures.
- 5.8 State the necessity and types of canal linings, advantages and disadvantages of canal linings.
- 5.9 State the maintenance required for canals.
- 6.1 Define terms: watershed, watershed management.
- 6.2 State the necessity of watershed management.
- 6.3 List the objectives of watershed management

- 6.4 List the characteristics of watershed
- 6.5 List the factors affecting water shed management.
- 6.6 State the causes of watershed deterioration and their result.
- 6.7 Explain Watershed management practices
- 6.8 Explain rain water harvesting.
- 6.9 Explain soil moisture conservation methods
- 6.10 Explain various techniques to control soil erosion.

Suggested Student Activities

1. Tech fest/Srujana
2. Paper/Poster presentation
3. Quiz
4. Group discussion
5. Field visit to nearby irrigation structures and prepare notes.
6. Observe watershed management system in your village and prepare presentation.

CO-PO Mapping Matrix

	Basic knowledge	Discipline Knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & sustainability	Ethics	Individual and Team work	Communication	Lifelong learning	Linked PO
CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	
CO1	1	2	2		2	1				2	1,2,3,5,6,10
CO2	2	2	2	2	2		1			2	1,2,3,4,5,7,10
CO3		2			2	1				2	2,5,10
CO4	2	3	1		3	3	1			3	1,2,5,6,7,10
CO5		3	1		3	3	2			3	1,2,5,6,7,10
CO6	2	3	2	2	3	3	3			3	1,4,5,6,7,10

Internal Evaluation

Test	Units	Marks
Mid Sem 1	1 and 2	20
Mid Sem 2	3 and 4	20
Slip Test 1	1 and 2	5
Slip Test 2	3 and 4	5
Assignments		5
Seminars		5
	Total	60

QUESTION PAPER PATTERN FOR MID SEMESTER EXAMS

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	4	1	Nil	4 Marks
02	Part-B	Understanding(U)	4	3	2	6 Marks
03	Part-C	Application(A)	4	5	2	10 Marks
Total Marks						20 Marks

MID SEM-I EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-I	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-II	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

MID SEM-II EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-III	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-IV	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

The length of answer for each question framed in respect of Part-A, B&C shall not exceed ¼ of a page,1 page and 2 pages respectively

QUESTION PAPER PATTERN FOR SEMESTER END EXAM

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	8	1	Nil	8 Marks
02	Part-B	Understanding(U)	8	3	4	12 Marks
03	Part-C	Application(A)	8	5	4	20 Marks
Total Marks						40 Marks

Unit No	Questions to be set for SEE				
	R		U		A
I	Q4	Q1		Q9(a)	Q13(a)
II					
III		Q2		Q10(a)	Q14(a)
IV					
V		Q3	Q5,Q6	Q9(b), Q11(a), Q11(b)	Q13(b), Q15(a), Q15(b)
VI			Q7,Q8	Q10(b), Q12(a), Q12(b)	Q14(b), Q16(a), Q16(b)
Total Questions		8		8	8

State Board of Technical Education and Training, Telangana

**Model Question paper
DCE IV semester
Mid Semester-I Examination**

Corse Code: 18C-405C

Duration: 1 hour

Course Name: IRRIGATION ENGINEERING

Max.Marks: 20

PART-A

Answer **all** questions. Each question carries **one** mark. **4x1 = 4 Marks**

1. Define irrigation.
2. Differentiate between flow irrigation and lift irrigation
3. List the important components of Hydrological cycle.
4. Define the terms 1) catchment 2) intercepted catchment

PART –B

Answer **two questions**. Each question carries **Three** marks

2x3=6 Marks

5(a). Write the necessity of irrigation.

(OR)

5(b) The base period of a crop is 140 days. The total depth of water required is 800 mm. Find the Duty.

6(a) What are the points to be considered for setting up of Rain gauge station at a place.

(OR)

6(b) What is runoff and write its types

PART-C

Answer **two questions**. Each question carries **five** marks

2x5=10 Marks

7(a) What are the advantages of Irrigation

(OR)

7(b) What are the factors that will affect the Duty of water.

8(a) With a neat sketch explain Hydrological cycle.

(OR)

8(b) With a neat sketch explain the working of Simon's Rain gauge.

State Board of Technical Education and Training, Telangana

**Model Question paper
DCE IV semester
Mid Semester-II Examination**

Corse Code: 18C-405C

Course Name: IRRIGATION ENGINEERING

Duration: 1 hour

Max. Marks: 20 Marks

PART-A

Answer **all** questions. Each question carries **one** mark. **4x1 = 4 Marks**

1. Define head works?
2. What is creep length.
3. Define full reservoir level and maximum water level
4. Define live storage and Dead storage.

PART –B

Answer **two questions** . Each question carries **threemarks**

2x3=6 Marks

5(a). Differentiate between barrage and a weir

(OR)

5(b). List the component parts of a weir.

6(a). Differentiate between low and high dam

(OR)

6(b). Draw the practical profile of a low dam.

PART-C

Answer **two questions** . Each question carries **five** marks

2x5=10 Marks

7(a) Draw the layout of a Diversion headwork and list various parts.

(OR)

7(b) Draw the cross section of a weir and name various parts.

8(a) What are the points to be considered for selection of site for a dam

(OR)

8(b) What is Elementary Profile of a gravity dam. Find the minimum base width of elementary profile for reservoir full condition.

State Board of Technical Education and Training, Telangana
Model Question paper
DCE IV semester
Semester End Examination

Corse Code: 18C-405C

Duration: 2 hours

Course Name: IRRIGATION ENGINEERING

Max.Marks: 40 Marks

PART-A

Answer **all** questions. Each question carries one mark. **8x1 = 8 Marks**

1. Define Base period, Crop period.
2. What is a Diversion Headworks and Storage Headworks
3. Define the terms watershed and watershed management.
4. List different methods of estimating Average rain fall over an area.
5. Write the classification of canals based on carrying capacity of canal.
6. Define balancing depth of cutting.
7. What is rain water harvesting
8. Define soil erosion.

PART-B

Answer **four** questions. Each question carries **three** marks

4x3=12 marks

9(a). Define Duty, Delta, and Base period.

(OR)

9(b). Write the methods of canal alignment.

10(a) Write the purpose of diversion head works.

(OR)

10(b) Write any three methods of controlling soil erosion.

11(a). Draw the cross section of a canal in cutting.

(OR)

11(b). Write any three functions of a head regulator.

12(a). What is check dam and write its functions.

(OR)

12(b). What is water harvesting and write any 4 methods to improve ground water level.

PART-C

Answer **four** questions. Each Question carries **five** marks

4x5=20 marks

13(a) Explain Thiessen's Polygon method for the estimation of average rainfall over an area.

(OR)

13(b) What is the necessity of canal lining List different types of canal linings

14(a) Draw the cross section of a weir state the functions of the component parts

(OR)

14(b) What are the objectives of watershed management.

15(a) Briefly explain about the maintenance works of a canal

(OR)

15(b) Draw a neat sketch of Siphon spillway and explain its working.

16(a) Explain about different soil conservation methods.

(OR)

16(b) Write the characteristics of watershed.

Department of Technical Education

State Board of Technical Education & Training (TS)

Course Title:	Civil Engineering Drawing	Course Code :	18C-406P
Semester:	IV Semester	Course Group :	Practical
Teaching Scheme in Periods(L:T:P):	15:0:30	Credits :	1.5
Methodology :	Lecture+ Practical	Total Contact Periods :	45Periods
CIE :	60 Marks	SEE :	40 Marks

Pre requisites

Basic knowledge of Engineering Drawing, ability to visualise 2D and 3D views

Course Outcomes

On completion of the course the student will be able to

CO1	Draw and illustrate the plan, elevation and section of culverts and drawings
CO2	Draw and illustrate the plan, elevation and section of Bridge drawings
CO3	Draw and demonstrate the plan, elevation and section of irrigation drawings
CO4	Draw and illustrate the plan, elevation and section of public health drawings

Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Hours/Periods	Questions to be set for SEE		
			R	U	A
1	Culverts and Bridges	15	1	1	1
2.	Irrigation drawings	15		2	
3.	Public health Engineering drawings	15			1
Total		45	1	3	2

Course Contents

UNIT 1: Simple Culverts and Bridges

Duration: 15 Periods(L:5 – P:10)

- a) Pipe culvert (Single Pipe)
- b) R.C.C slab culvert with square return walls
- c) Two-Span R.C.C T-beam Bridge with square return walls.
- d) Two-Span R.C.C Bridge with splayed wing walls and Return walls.

UNIT 2: Irrigation engineering drawings

Duration: 15 Periods(L:5 – P:10)

- a) Earthen bunds – Two types.
 - (i) Homogeneous type
 - (ii) Non Homogeneous type.
- b) Tank surplus weir with splayed wing walls.
- c) Tank sluice with tower head.
- d) Canal drop (notch type)
- e) Canal regulator

UNIT 3: Public health engineering drawings

Duration: 15 Periods(L:5 – P:10)

- a) Plan and cross section of a sanitary block showing internal water supply and sanitary fittings
- b)** Septic tank and soak pit with details of connections
- c) R.C.C overhead square tank. (four columns with all accessories).
- d)** Draw plan and cross section of a rain water harvesting pit for a residential building.

Recommended Books

1. Civil Engineering Drawing-II by N. Srinivasulu.
2. Civil Engineering Drawing-II by Chakravarthy

Suggested E-learning references

1. <http://nptel.ac.in>
2. <https://www.youtube.com/watch?v=1JdAPaDHueM>

Suggested Learning Outcomes

After completion of the subject, the student will be able to

- 1.1. Draw the plan, cross sectional elevation and longitudinal sectional elevation of Pipe culvert and identify the component parts from the given set of specifications
- 1.2. Draw the plan, cross sectional elevation and longitudinal sectional elevation R.C.C –slab culvert and identify the component parts from the given set of specifications.
- 1.3. Draw the plan, sectional elevation and cross section of Two span R.C.C T-beam bridge with square return walls from the set of given specifications.
- 1.4. Draw the sectional elevation, plan and cross section of Two span R.C.C bridge with splayed wing walls and return walls from the set of given specifications.

- 2.1. Draw the cross section view of Earthen bunds – Two types
(i) Homogeneous type (ii) Non-Homogeneous type.
- 2.2. Draw the plan, cross sectional elevation and longitudinal sectional elevation of Tank surplus weir with splayed wing walls.
- 2.3. Draw the plan, cross sectional elevation and longitudinal sectional elevation of Tank sluice with tower head.
- 2.4. Draw the plan, cross sectional elevation and longitudinal sectional elevation of Canal drop (notch type)
- 2.5. Draw the plan, cross sectional elevation and longitudinal sectional elevation of Canal regulator

- 3.1. Draw plan and cross section of a sanitary block showing internal water supply and sanitary fittings
- 3.2. Draw the plan, cross-section elevation of Septic tank and soak pit with details of connections
- 3.3. Draw the plan, elevation of R.C.C overhead square tank. (four columns with accessories).
- 3.4. Draw plan and cross section of a rain water harvesting pit for a residential building.

Suggested Student Activities

1. Tech fest/Srujana
2. Paper/Poster presentation
3. Quiz
4. Group discussion
5. Surprise Test
6. Roof rainwater harvesting - a case study
7. Visit to a nearby canal, take the field data and draw the c/s of canal.
8. Identify and take the details of existing tank weir/tank sluice in the vicinity of your area and draw all the views.
9. Identify and take the details of existing culvert/highway bridge/railway bridge nearby and draw all the views.
10. For the given data prepare a model of any one of the following.
 - a. Tank sluice
 - b. Tank weir
 - c. Culvert
 - d) Railway/Highway bridge
11. Prepare a 3D model of Irrigation structure in CAD software

CO-PO Mapping Matrix

	Basic knowledge	Discipline Knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & sustainability	Ethics	Individual and Team work	Communication	Lifelong learning	Linked PO
CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	
CO1	2	2	2		1			1	1		1,2,3,5,8,9
CO2	2	2	3		3			2	2		1,2,3,5,8,9
CO3	1	3	2		2			3	3		1,2,3,5,8,9
CO4	2	3	2		3			3	2		1,2,3,5,8,9

QUESTION PAPER PATTERN FOR MID SEMESTER EXAMS

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R) and Understanding(U)	2	4	Nil	8 Marks
02	Part-B	Application(A)	2	12	1	12 Marks
Total Marks						20 Marks

QUESTION PAPER PATTERN FOR SEMESTER END EXAM

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R) and Understanding(U)	4	4	Nil	16 Marks
02	Part-B	Application(A)	2	24	1	24 Marks
Total Marks						40 Marks

State Board of Technical Education and Training, Telangana
Model Question paper
DCE IV semester
Mid Semester-I Examination

Corse Code:18C-406P

Course Name: CIVIL ENGINEERING DRAWING

Duration:1 hour

Max.Marks:20 Marks

PART-A

Answer **all** questions.Each question carries **fourmarks2x 4 = 8 Marks**

1. Draw the cross section of pipe culvert for following particulars.

Internal dia of pipe = 1000mm

External dia of pipe = 1200mm

Width of bedding = 1600mm

Thickness of bedding = 300mm

Thickness of benching = 250mm

2. Draw the cross section of an abutment of slab culvert for the following data:

Bottom level of CC bed = +45.20m

Top level of CC bed = +45.80m

Width of CC bed = 2.2m

Bed level = +47.00m

Masonry footings of abutments = Consists of two below B.L.

Footings of equal depth and offsets on rear side only

Width of first footing = 1.8m,

Width of second footing = 1.6m

Top level of abutment = + 48.50m,

Thickness of bed block flushing

With of top abutment = 0.3 m

Top width of abutment = 0.9 m having batter on rear face

Thickness of slab = 200 mm,

Thickness of wearing course = 60mm

PART-B

Answer any **one** question.Each

Marks

1x12=12

3. Draw the plan and the longitudinal section of a pipe culvert to scale 1:100 to the given Particulars:

- i) Drain particulars

Bed level : +50.350

Bed width near the pipe culvert: 1200mm

Side slopes of drain : 1:1

General G.L. near the drain : +51.550

Bed pitching and side slope revetment on both U/S and D/S = 200mm, rough

Stone bed pitching to a length of 1200 mm shall be provided both on U/S and D/S. A toe of same width (200mm) shall be taken to a level of +50.00 at the end of bed pitching.

Sides slope revetment shall be with 200mm size rough stone along the slopes to a length of 1200mm both on US/ and D/S from both B.L to general G.L.

ii) Pipes Details:

Internal diameter of C.C. pipe : 1000mm
External diameter of C.C. pipe : 1200mm
Bedding for the Pipe : 250mm CC
Benching for the pipe : 300mm CC
Width of both bedding and pitching : 1800 mm
Bottom level of C.C. bedding : +50.00m
No. of pipes : One

iii) Head walls:

At the end of pipe, two head walls are provided with brick masonry with the Following details:

Length of head wall : 7200mm
Bottom level of head wall : +49.10
Top level C.C. bed provided under head walls : +49.10
Bottom level of C.C. bed provided under head walls: +48.80
Width of C.C. Bed : 1800mm
Bottom width of head wall : 1200mm
Profile of head wall = outer surface vertical and earth fill face having a batter so that the top width = 450mm.
Top level of head wall : +52.00

iv) Earth fill and Embankment:

Formation width : 10,000 mm
Side slopes : 2 horizontal to 1 vertical
Formation level : +54.00
Height of earth fills : top level of formation – top level of pipe = 54.00 - 51.450 = 2.550m

v) Guide stones on both the sides of formation:

450mm x 450mm square guide stones are provided at distance of 450mm from extreme edges of formation. These stones are taken to a depth of 600mm below formation level and extended to a height of 700mm above formation level at 3000mm C.C.

4. Draw the following view of a small T-beam and deck slab bridge of two spans across a canal to a scale of 1: 50 from the given specifications. The type of structure is box type

i) Half cross-section & half elevation along the road.

Specifications:

i). General

No. of spans = 2
Clear width of each span = 3.5m
Bed level of canal = +50.00
F.S.L = +52.00
Free board = 1.0m
Road formation level = +53.58
Side slopes of canal = 1:1

Road width between parapets =4.40m
Road width between kerbs =4.10m
Kerb one either side =150mmx150mm
Wing walls =Return type

ii). Foundation:

The depth of foundation is same for abutments, wing walls and pier and is taken to level of + 49.30.

Depth of C.C bed below abutments, wing walls and pier is same and equal to 400mm; i.e. top level of C.C bed =+49.70 and bottom level of C.C bed =+49.30.

Width of CC bed:

- a. For abutments =1700mm
- b. for wing walls =1400mm
- c. For pier =1000mm

Bottom width of stone masonry abutment at +49.70 level = 1300mm: length = 5.9m. Bottom width of stone masonry wing walls at + 49.70 level = 1000mm Length
(as measured on outer side) = 3.9m

iii). Pier:

Width of stone masonry for pier is 600 mm and is same throughout its height
(up to bed block). Cut water sharp to 60° and ease water semi-circular shape are provided.

iv). Top width of abutments and wing walls:

The water face is vertical and rear side (earth retaining side) has a batter both for
abutments and wing walls.

Top width of abutment = 700mm

Top width of wing wall =500mm

v). T-beams:

Three no. of T-beams are provided one at the centre and one on either side at 2m c/c, having equal overhang
of deck slab on both sides.

Width of rib =250 mm

Depth of rib =500 mm

Bearing for T-beams over abutments =500mm

vi). C.C bed blocks:

T-beams are laid over C.C bed blocks provided over the abutments and wing walls.

Size of bed block is 600mmx600mmx150mm and is laid below the ribs of T-beam.

vii). R.C.C. deck slab:

200mm thick R.C.C (1:2:4) slab is provide with 20mm thick wearing course
(C.C 1: 1 ½:3) with 8mm size stone chips. Width of R.C.C deck slab = 4.9m.

viii). Parapet:

Brick masonry parapet 300mm square pillars with 50mm projecting copings on either

Side at top are provided, one at middle and one each at the ends. R.C.C posts at 1m

Clear spacing of size 100x 100 x 750mm with 25mm dia. Pipe, hand rails comprises the Parapet.

ix.) Side revetment:

Canal sides which are at 1:1 slope are provided with rough stone revetment 300mm thick over a gravel bed of
150mm thick for sufficient length. The toe wall for revetment is taken to a level of +49.40 with its bottom
width equal to 450mm.

Note: Any other data required may be assumed suitably.

State Board of Technical Education and Training, Telangana
Model Question paper
DCE IV semester
Mid Semester-II Examination

Corse Code: 18C-406P
Course Name: CIVIL ENGINEERING DRAWING

Duration: 1 hour
Max. Marks: 20 Marks

PART-A

Answer **all** questions. Each question carries **four** marks **2x4 = 8 Marks**

1. Sketch the central section along the tank bund of the well of a tower head sluice from the following :
Internal dia = 1.0 m
Height of well = 4.2 m
Thickness of well staining = 0.45 m from top to a depth of 2.0 m and 0.60 m for the remaining
CC foundation = 0.5 m thick with 0.3 m offset
Thickness of slab = 150 mm thick
Wooden shutter = 0.70 m wide × 1.2 m deep
Provide suitable rod and gearing rearrangement for the wooden shutter.
2. Draw the longitudinal section of a canal drop and name the component parts.

PART-B

Answer any **one** question

1x12=12 Marks

3. Draw the cross-section of a homogenous earthen bund with the following specifications to a scale of 1 : 100.
Top width of bund = 1.5 m
TBL = +57.00
General ground level = +50.00
Stripped ground level = +49.70
Side slopes = 1½ : 1 on U/S and 2 : 1 on D/S
Key trenches = 1.2 m wide and 0.6 m deep at 4.0 m C/C
Protection of upstream face of the bund :
The upstream face of the bund is provided with 300 mm thick rough stone revetment over 15 mm thick gravel backing.
This revetment is founded on rough stone wall 1.0 m wide 1.0 m deep
Protection of a downstream toe of the bund :
A rock toe with 300 mm rough stone boulders is provided with 900 mm top width and top level being at +51.20.
Side slopes of rock toe = 1 : 1
Sand filter = 200 mm thick on rear side and at the bottom of the rock toe
Toe drain = A longitudinal drain is provided with bottom width 1.0 m and side slopes 1 : 1.
This is in line with the outersurface of rock toe and taken to a level of +49.00
Rough stones of 300 mm thick are used for side revetment and bed pitching of toe drain

4. Draw the longitudinal section of a tank sluice with tower head to a scale of 1: 50.

(a) Tank bund :

Top width = 1.8 m

TBL = +163.500 m

MWL = +162.000

FTL = +161.300

Bed level = +159.100

Side slopes = $1\frac{1}{2}$: 1 on U/s and 2 : 1 on D/s

(b) Tower head :

Internal diameter = 1.2 m

Top of RCC slab over well = +162.50

Thickness of well staining = 450 mm from top to a depth of 2 m and 600 mm for the remaining height

Opening = 600 mm dia opening is provided in the CC diaphragm 75 mm thick for allowing water into the barrel.

Shutter = Wooden shutter 750 mm wide, 1500 mm depth and 50 mm thick is provided for regulating water

Foundation for well = 3.0 m dia and 600 mm thick

(c) Sluice barrel :

Internal dimensions = 750 mm wide $\times$ 1.0 m height

Roof for barrel = RCC roof slab 150 mm thick

Side walls of the barrel = 450 mm thick at top and 600 mm thick at bottom with water face vertical

CC foundation = 450 mm thick and 2550 mm wide is laid under barrel

(d) Lead chamber :

Length of wing walls = 1.8 m (horizontal distance) Distance between wing walls inside to inside at the receiving end = 2.0 m

Thickness of walls = 450 mm at top and 600 mm at bottom with water face vertical

Profile of wing walls = Wing walls start from +160.25

(top of barrel slab) at the entrance of the barrel and slopes down to the bed level +159.10. The slope from GL to bed level is $1\frac{1}{2}$: 1.

(e) Stilling cistern :

Internal dimensions : 3.0 m $\times$ 3.0 m

Side walls = All the side walls including the outer wall having an opening of 600 mm for discharging water into field channel are 600 mm thick at bottom and 450 mm thick at top, having batter on rear side. These walls are taken to canal bund level +160.75

(f) Canal particulars :

Bed width = 600 mm

Side slopes = 1:1 on water side and $1\frac{1}{2}$:1 on rear side up to GL

Bed level = +159.10

Width of canal bund = 900 mm

Canal bund level = +160.750

(g) Rough stone revetment :

(i) 450 mm rough stone revetment is provided on U/s over 150 mm thick gravel backing from bed level to TBL

(ii) Sides of canal are provided with 300 mm thick rough stone revetment over 150 mm thick gravel backing for a length of 1.5 m. Bed pitching is also provided in the canal to a length of 1.20 m with 300 mm size rough stone and a toe is provided at its end and taken to a depth of 600 mm below bed level of canal. Width of toe = 300 mm

(h) General ground level at the site = +159.50

State Board of Technical Education and Training, Telangana
Model Question paper
DCE IV semester End Examination

Corse Code: 18C-406P

Course Name: CIVIL ENGINEERING DRAWING

Duration: 2 hours

Max. Marks: 40 Marks

PART-A

Answer **all** questions Each question carries **four** marks

4x4=16 Marks

1. Sketch the section at support of an RCC slab bridge showing bed block and abutment cross-section and name the parts.
2. Draw the longitudinal section of the body wall of a canal drop with the following data :
 - Length of body wall = 9.0 m
 - Top of notch pier = + 45.00 m
 - Top of body wall = + 44.00 m
 - Top of CC foundation = + 42.80 m
 - Bottom of CC foundation = + 42.20 m
 - Offset of CC foundation = 0.3 m on either side
 - Notch = Trapezoidal shape with bottom width 0.6 m and side slopes = 1 : 1
3. Draw the sectional plan of RCC overhead tank from the data given below :
 - Size of water tank = 4500 mm × 4500 mm
 - Thickness of sidewalls = 200 mm
 - Columns' size = 400 mm × 400 mm
 - Size of column footings = 1500 mm × 1500 mm
 - Size of brace beams = 300 mm × 300 mm
4. Draw the cross section of a water harvesting pit

PART-B

Answer any **one** question. Each question carries **twenty four** marks.

1x24=24 Marks

5. Draw the longitudinal section of a tank sluice with tower head to a scale of 1: 50.
 - (a) Tank bund :
 - Top width = 1.8 m
 - TBL = +163.500 m
 - MWL = +162.000
 - FTL = +161.300
 - Bed level = +159.100
 - Side slopes = 1½ : 1 on U/s and 2 : 1 on D/s
 - (b) Tower head :
 - Internal diameter = 1.2 m
 - Top of RCC slab over well = +162.50
 - Thickness of well staining = 450 mm from top to a depth of 2 m and 600 mm for the remaining height

Opening = 600 mm dia opening is provided in the CC diaphragm 75 mm thick for allowing water into the barrel.

Shutter = Wooden shutter 750 mm wide, 1500 mm depth and 50 mm thick is provided for regulating water

Foundation for well = 3.0 m dia and 600 mm thick

(c) Sluice barrel :

Internal dimensions = 750 mm wide $\times$ 1.0 m height

Roof for barrel = RCC roof slab 150 mm thick

Side walls of the barrel = 450 mm thick at top and 600 mm thick at bottom with water face vertical

CC foundation = 450 mm thick and 2550 mm wide is laid under barrel

(d) Lead chamber :

Length of wing walls = 1.8 m (horizontal distance)

Distance between wing walls inside to inside at the receiving end = 2.0 m

Thickness of walls = 450 mm at top and 600 mm at bottom with water face vertical

Profile of wing walls = Wing walls start from +160.25

(top of barrel slab) at the entrance of the barrel and slopes down to the bed level +159.10.

The slope from GL to bed level is $1\frac{1}{2} : 1$.

(e) Stilling cistern :

Internal dimensions : 3.0 m $\times$ 3.0 m

Side walls = All the side walls including the outer wall having an opening of 600 mm for discharging water into field channel are 600 mm thick at bottom and 450 mm thick at top, having batter on rear side. These walls are taken to canal bund level +160.75

(f) Canal particulars :

Bed width = 600 mm

Side slopes = 1:1 on water side and $1\frac{1}{2}:1$ on rear side up to GL

Bed level = +159.10

Width of canal bund = 900 mm

Canal bund level = +160.750

(g) Rough stone revetment :

(i) 450 mm rough stone revetment is provided on U/s over 150 mm thick gravel backing from bed level to TBL

(ii) Sides of canal are provided with 300 mm thick rough stone revetment over 150 mm thick gravel backing for a length of 1.5 m. Bed pitching is also provided in the canal to a length of 1.20 m with 300 mm size rough stone and a toe is provided at its end and taken to a depth of 600 mm below bed level of canal.

Width of toe = 300 mm

(h) General ground level at the site = +159.50

6. Draw the sectional elevation and plan of a square RCC overhead tank with the following data to a scale of 1: 50 :

Height of the tank (from GL to bottom of the tank, i.e., top of floor slab or base slab) = 9.0 m

Size of tank = 5.0 m $\times$ 5.0 m $\times$ 1.75 m

Thickness of RCC side walls = 200 mm

Thickness of RCC base/floor slab = 200 mm

Thickness of RCC roof slab = 110 mm

Size of RCC column = 400 mm $\times$ 400 mm

No. of RCC column = 4 no. (one at each corner)

Size of RCC brace beams = 400 mm×350 mm
Spacing of brace beams = 3·0 m c/c
Depth of RCC footing below ground level = 2·0 m
Size of footing at base = 1·6 m×1·6 m
Thickness of footing at column face = 500 mm
Thickness of footing at the end = 200 mm
Thickness of levelling course below the footing = 200 mm,(1: 4 : 8) plain concrete
Size of ring beam below base slab = 400 mm×450 mm
Dia. of inflow pipe = 100 mm
Dia. of outflow pipe = 75 mm
Size of manhole cover = 600 mm×450 mm
Show the pipe connections; ladder, water level indicator, ventilating arrangements etc.
Assume any other data suitably if needed.

Department of Technical Education

State Board of Technical Education & Training (TS)

Course Title:	Hydraulics Lab	Course Code :	18C-407P
Semester:	IV Semester	Course Group :	Practical
Teaching Scheme in Periods(L:T:P):	15:0:30	Credits :	1.5
Methodology :	Lecture+ Practical	Total Contact Periods :	45Periods
CIE :	60 Marks	SEE :	40 Marks

Pre requisites

Basic Knowledge of Hydraulics

Course outcomes

Upon completion of the course the learner shall be able to

CO1	Calculate the flow parameters like discharge, velocity etc of flow measuring devices
CO2	Determine flow rates, pressure variations, various losses for flow through pipes
CO3	Calculate the constants in open channel flow
CO4	Identify the component parts of Pumps & Turbines

Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Periods
1	Orifices, Mouthpieces and Notches	15
2	Verification of Bernoulli's theorem and study of Pipe flow parameters	15
3	Open channel flow and Study of Fluid machines	15
Total		45

Course Contents

LIST OF EXPERIMENTS:

I. Orifices, Mouthpieces, Notches and weirs

Duration: 15 Periods(L:5 – P:10)

1. Determination of coefficient of discharge of a small orifice by constant head method
2. Determination of Cc of an orifice by finding Cv and Cd.
3. Determination of coefficient of discharge of a mouthpiece by constant head method

4. Determination of coefficient of discharge of a Rectangular and triangular notch.
5. Determination of coefficient of discharge of a trapezoidal notch

II .Verification of Bernoulli's theorem and study of Pipe flow parameters

Duration: 15 Periods(L:5 – P:10)

6. Verification of Bernoulli's theorem.
7. Determination of coefficient of a discharge of a venture meter.
8. Determination of friction factor in pipe flow.

III. Open channel flow and Study of Fluid machines

Duration: 15 Periods(L:5 – P:10)

9. Determination of Chezy's constant in open channel flow.
10. Study of reciprocating pump
11. Study of centrifugal pump.
12. Study of turbines – Pelton Wheel
13. Study of turbines – Francis Turbine
14. Study of turbines – Kaplan Turbine

KEY Competencies to be achieved by the student

S.No	Experiment Title	Key Competency
1	Coefficient of discharge of small Orifice by constant head.	Regulate the flow Operate stop clock accurately Draw graph between Q vs $H^{1/2}$
3	Hydraulic coefficients of an orifice.	Regulate flow. Note co-ordinate values and measure volume Operate stop clock accurately. State the relation.
4	Coefficient of discharge of mouth piece by constant head.	Regulate the flow. Operate stop clock accurately graph between Q vs $H^{1/2}$
5	Coefficient of discharge of rectangular notch.	Note readings of head Operate stop clock accurately Draw graph between Q vs $H^{3/2}$
6	Coefficient of discharge of triangular notch	Note readings of head Operate stop clock accurately Draw graph between Q vs $H^{5/2}$
7	Coefficient of discharge of trapezoidal	Note readings of head Operate stop clock

	notch	accurately. Compare the results of rectangular and triangular notch.
8	Verify Bernoulli's theorem	Note readings of head at various locations Plot hydraulic gradient line and total energy line
9	Coefficient of discharge of Venturimeter.	Note readings of head Operate stop clock accurately. Draw graph between Q vs.H ^{1/2}
10	Friction factor in pipe flow.	Note readings of head Observe the significance of friction factor of pipe flow.
11	Chezy's constant	Note readings of head. Observe the significance in design of section of open channel

Recommended Books

1. Hydraulics Lab Manual by S.K.Likhi, NewAge International Pvt Ld
2. Laboratory Manual of Hydraulic and Hydraulic Machines by R.V.Raiker, Prentice Hall India learning Pvt Ltd

Suggested E-learning references

1. <http://nptel.ac.in>

Specific Learning Outcomes

Upon completion of the course the learner shall be able to

- 1.1 State the principle / law / apparatus / equipment required for testing for determination of Cd of Orifices by constant head method
- 1.2 Perform test and record observations.
- 1.3 Draw inferences on the relationship between parameters.

1.4 Draw a graph between Q vs $H^{1/2}$.

1.5 State the principle / law / apparatus / equipment required for testing for determination of C_d of Mouthpieces

1.6 Perform test and record observations.

1.7 Draw inferences on the relationship between parameters.

1.8 Draw a graph between Q vs $H^{1/2}$

1.9 State the principle / law / apparatus / equipment required for testing for determination of C_d of Rectangular Notches

1.10 Perform test and record observations.

1.11 Draw inferences on the relationship between parameters.

1.12 Draw a graph between Q vs $H^{3/2}$.

1.13 State the principle / law / apparatus / equipment required for testing for determination of C_d of Triangular Notches

1.10 Perform test and record observations.

1.11 Draw inferences on the relationship between parameters.

1.12 Draw a graph between Q vs $H^{5/2}$.

1.13 State the principle / law / apparatus / equipment required for testing for determination of C_d of Trapezoidal Notches

1.14 Perform test and record observations

1.15 Draw inferences comparing the results with rectangular notch and triangular notch.
on the relationship between parameters.

2.1 States the principle/law /apparatus/equipment required for verification of Bernoulli's Theorem

2.2 Perform test and record observations.

2.3 State Inference and application.

2.4 Plot Hydraulic gradient line and Total energy line.

2.5 State the Aim /apparatus/equipment required to determine the C_d for flow through Venturimeter

2.6 Perform test and record observations.

2.7 State Practical application.

2.8 Draw a graph between Q vs. $H^{1/2}$

2.9 State the Aim /apparatus/equipment required to determine the friction factor in pipe flow.

2.10 Perform test and record observations.

2.11 State Importance of friction factor in pipe design.

3.1 State the Aim / apparatus / equipment required to determine the Chezy's coefficient in Open channel flow.

3.2 Perform test and record observations.

3.3 State Importance in design of section of open channel.

3.4 Identify the component parts of a Reciprocating pump

- 3.5 State the functions of each component of Reciprocating pump
- 3.6 State field applications for Reciprocating pump
- 3.7 Identify the component parts of a centrifugal pump
- 3.8 State the functions of each component of centrifugal pump
- 3.9 State field applications for centrifugal pump
- 3.10 State field applications and compare with Reciprocating pump.
- 3.11 Identify the component parts of Pelton wheel, Francis or Kaplan turbines.
- 3.12 State function of each component
- 3.13 State field applications of Turbines

Suggested Student Activities

1. To carryout market survey for pipes of different sizes and materials available.
2. To visit & submit a report on nearby canal/irrigation structures/dam site to know the usage of notches and weirs.
3. To visit & submit a report on nearby hydel power plant to know the type of turbine installed and its setup.
4. Student is encouraged to attend the Tech fest/Srujana
5. Paper/Poster presentation
6. Quiz
7. Group discussion
8. Surprise Test

CO-PO Mapping Matrix

	Basic knowledge	Discipline Knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & sustainability	Ethics	Individual and Team work	Communication	Lifelong learning	Linked PO
CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	
CO1		2	2	2		1		2			2,3,4,6,8
CO2		3	1	2		2		1			2,3,4,6,8
CO3		3	2	2	2	3		2			2,3,4,5,6,8
CO4		2	2	3	2	2		1			2,3,4,5,6,8

State Board of Technical Education and Training, Telangana
Model Question paper
DCE IV semester
Mid Semester-I Examination

Corse Code: 18C-407P
Course Name: HYDRAULICS LAB

Duration: 1 hour
Max. Marks: 20 Marks

Pick any one experiment from the given list 1x20=20Marks

1. Determination of coefficient of discharge of a small orifice by constant head method
2. Determination of Cc of an orifice by finding Cv and Cd.
3. Determination of coefficient of discharge of a mouthpiece by constant head method
4. Determination of coefficient of discharge of a Rectangular notch.
5. Determination of coefficient of discharge of a triangular notch
6. Determination of coefficient of discharge of a trapezoidal notch

State Board of Technical Education and Training, Telangana
Model Question paper
DCE IV semester
Mid Semester-II Examination

Corse Code: 18C-407P
Course Name: HYDRAULICS LAB

Duration: 1 hour
Max. Marks: 20 Marks

Pick any one experiment from the given list 1x20=20M

1. Verification of Bernoulli's theorem.
2. Determination of coefficient of a discharge of a venture meter.
3. Determination of friction factor in pipe flow.

State Board of Technical Education and Training, Telangana
Model Question paper
DCE IV semester
Semester End Examination

Corse Code: 18C-407P
Course Name: HYDRAULICS LAB

Duration: 2 hours
Max. Marks: 40 Marks

Pick any one experiment from the given lot 1x40=40M

1. Determination of coefficient of discharge of a small orifice by constant head method
2. Determination of Cc of an orifice by finding Cv and Cd.
3. Determination of coefficient of discharge of a mouthpiece by constant head method
4. Determination of coefficient of discharge of a Rectangular and triangular notch.
5. Determination of coefficient of discharge of a triangular notch
6. Determination of coefficient of discharge of a trapezoidal notch
7. Verification of Bernoulli's theorem.
8. Determination of coefficient of a discharge of a venture meter.
9. Determination of friction factor in pipe flow.
10. Determination of Chezy's constant in open channel flow.

Department of Technical Education

State Board of Technical Education & Training (TS)

Course Title:	Modern Surveying Lab	Course Code :	18C-408P
Semester:	IV Semester	Course Group :	Practical
Teaching Scheme in Periods(L:T:P):	15:0:30	Credits :	1.5
Methodology :	Lecture+ Practical	Total Contact Periods :	45Periods
CIE :	60 Marks	SEE :	40 Marks

Pre requisites

Basic knowledge of Theodolite surveying, Tacheometric surveying, working principles of Electronic Theodolite, EDM, Total station and GPS.

Course Outcomes

Upon completion of the course, the student should be able to

CO1	Use Electronic Theodolite in the fields of Civil engineering survey
CO2	Use total station in the field of Civil engineering land survey.
CO3	Use GPS in the fields of civil engineering
CO4	Describe the Digitization the maps

Course Content

Unit No	Unit Name	Periods
1	Electronic Theodolite and Electronic Distance meter	15
2	Total Station	15
3	Global Positioning System and digitization of maps	15
Total		45

Course Contents

UNIT 1:

Electronic Theodolite and Electronic Distance meter

Duration:15Periods(L:5.0-P:10.0)

Demonstration of Electronic Theodolite- parts and functions-instrument preparation and setting-
horizontal angle between two stations-vertical angle between two stations.- traversing with Electronic
theodolite.

Demonstration of Electronic Distance measurement instrument-parts and functions-instrument preparation and setting-horizontal distance of a point from the instrument station by EDM

UNIT 2:

Total Station

Duration:15Periods(L:5.0-P:10.0)

Demonstration of Total Station-parts and functions- adjustments of total station for taking observations- measurement of Horizontal distance, slope distance, difference in Height between two points-Elevation of a point- horizontal angle and distance between two stations- setting out right angles at different points on a base line- setting out plan of a building on the ground- prolonging a straight line

Calculation of area-earth work calculations

UNIT 3: Global Positioning System and digitization of maps Duration:15Periods(L:5.0-P:10.0)

Study of hand held G.P.S. – measurement of coordinates (latitude, longitude and Altitude) of given point on the earth- selection and marking of routings (Way points) -navigation to any fixed point on the earth- calculation of area-linking GPS data with total station

Demonstration of the following-AutoCAD map- raster to vector conversion-scanning- Digitization- digitization of contour map from scanned picture- digitization of town map- showing the different layers like roads, railways, water supply line, drainage line etc.

KEY Competencies to be achieved by the student

S.NO.	Experiment Title	Key Competency
1.	Exercises on Electronic Theodolite	• Identify the parts of Electronic Theodolite • Place Electronic theodolite on tripod, checks batteries and switches • Set initial settings in Electronic theodolite • Centering of Electronic Theodolite • Measure horizontal angle/vertical angle

		• Conduct traverse survey
2	Exercises on Electronic distance meter	• Identify the parts of Electronic distance meter • Places EDM on tripod, checks batteries and switches on EDM • Set initial values in EDM • Centering of EDM over a given point and sighting reflecting prism to measure distance
3	Field Exercises using Total Station	• Places total station on tripod, checks batteries and switches on total station • Centering of total station over a given point and sighting reflecting prism to measure distance • Measure area of given field • Conduct traversing survey (closed Traverse) and gets plotting • Finds Height and width of an elevated object • Finds the elevation of Instrument point by making observation to point with known elevation • Knows station setup on a known point by making observations to one or more back sight points • Establish the position of an occupied point relative to a base line or a boundary line • Establish points, Lines and Arcs on the ground • Locates Centre line of a building on the ground • Collects data for L.S and C.S of proposed road/canal/pipe line on the ground • Calculate the quantity of earth work
4	Global Positioning System	• Determine the Co-ordinates (latitude, longitude and Altitude) of various points on the ground • Navigate to any fixed point on the earth using G.P.S • Selection and marking of route(Way points) using G.P.S • Calculate the area of a given land using G.P.S • Link the G.P.S data with Total Station
5	Demonstration of Digitization of Maps	• Understands software

		• Demonstrate Digitization of any given contour map. • Demonstratedigitization of given Town map and creating different layers for roads, railways, water supply lines and drainage lines etc.,
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Reference Books

1. Course material on G.I.S., G.P.S. by NITTTR, Chennai.
2. Computer applications in Civil Engineering by NITTTR, Chennai.
3. Course material on Modern surveying instruments by NITTTR, Chennai.
4. Alfred Leick, "GPS satellite surveying", John Wiley & Sons Inc., 3rd Edition, 2004.
5. Guocheng Xu, "GPSTheory, Algorithms and Applications", Springer Berlin, 2003.
6. SatheeshGopi, R. SathishKumar, N. Madhu, "Advanced Surveying, Total Station GPS and Remote Sensing" Pearson education , 2007

Suggested E-learning references

1. <http://nptel.ac.in>

Suggested Learning Outcomes

After the completion of the course, the student should be able to

- 1.1 Demonstrate Electronic Theodolite, list component parts of Electronic Theodolite and their functions
- 1.2 Prepare and do the temporary settings for taking observations to Electronic Theodolite
- 1.3 Determine the horizontal angle between two stations
- 1.4 Determine the vertical angle between two stations
- 1.5 Traverse with Electronic theodolite.
- 1.6 Demonstrate of Electronic Distance meter
- 1.7 List component parts of Electronic Distance meter and their functions
- 1.8 Prepare and do the temporary settings for taking observations to EDM
- 1.9 Determine the horizontal distance of a point from the instrument station by EDM
- 2.1 Demonstrate of Total Station, list the component parts of Total Station and functions
- 2.2 Prepare and do the temporary settings for taking observations to Total Station

- 2.3 Determine the Horizontal distance from instrument station to any point using Total Station
- 2.4 Determine the slope distance from instrument station to any point using Total Station
- 2.5 Determine the difference in Height between two points using Total Station
- 2.6 Determine the Elevation of a point using Total Station
- 2.7 Determine the horizontal angle and distance between two stations using Total Station
- 2.8 Set out right angles at different points on a base line using Total Station
- 2.9 Give Marking plan of a building on the ground using Total Station
- 2.10 Prolong a straight line using Total Station
- 2.11 Calculate of area of a given land using Total Station
- 2.12 Calculate the volume of earth work using Total Station
- 3.1 Identifies the parts and the functions of GPS
- 3.2 Determines the Co-ordinates (latitude, longitude and Altitude) of various points on the ground
- 3.3 Navigate to any fixed point on the earth using G.P.S
- 3.4 Select and mark of routings(Way points) using G.P.S
- 3.5 Calculate the area of a given land using G.P.S
- 3.6 Link the G.P.S data with Total Station
- 3.7 Study the concept of digitization
- 3.8 Demonstrate digitization of any given contour map
- 3.9 Demonstrate digitization of given town map and create different layers for roads, railways, water supply lines and drainage lines

Suggested Student Activities

1. Locate a permanent structure using GPS in your locality and prepare a map.
2. Prepare a topographical map by using total station.
3. To set out two parallel lines along both the sides of an obstacle by using total station.
4. To find the distance between two inaccessible points by using total station.
5. Prepare a report on any one of the following; Arial survey, photogrammetric survey, hydrographic survey, military survey and mine survey.

CO-PO Mapping Matrix

	Basic knowledge	Discipline Knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & sustainability	Ethics	Individual and Team work	Communication	Lifelong learning	Linked PO
CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	
CO1	1	2	3	3				3	2		1,2,3,4,8,9
CO2	1	3	3	3				3			1,2,3,4,8
CO3		3	3	3				3		3	2,3,4,8,10
CO4		2	2	2				2			2,3,4,8

State Board of Technical Education and Training, Telangana
MID SEMESTER-I Model Question paper
DCE IV Semester Examination

Course Code: 18C-408P

Duration: 1 hour

Course Name: Modern Surveying Lab

Max. Marks: 20 Marks

Instructions to the Candidate:

Pick and Answer any One of the following Questions from given list

Each question carries 20 Marks.

1. Determine the horizontal angle between two stations using electronic theodolite.
 2. Determine the vertical angle between two stations using electronic theodolite.
 3. Conduct traverse with Electronic theodolite.
 4. Perform the temporary settings for taking observations to EDM
 5. Determine the horizontal distance of a point from the instrument station by EDM
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State Board of Technical Education and Training, Telangana
MID SEMESTER-II Model Question paper
DCE IV Semester Examination

Corse Code:18C-408P

Duration:1 hour

Course Name: Modern Surveying Lab

Max.Marks:20 Marks

Instructions to the Candidate:

Pick and Answer any One of the following Questions from given list

Each question carries 20 Marks

1. Determine the Horizontal distance from Instrument station to any point using Total Station
2. Determine the slope distance from Instrument station to any point using Total Station
3. Determine the difference in Height between two points using Total Station
4. Determine the Elevation of a point using Total Station
5. Determine the horizontal angle and distance between two stations using Total Station
6. Set out right angles at different points on a base line using Total Station
7. Give Marking plan of a building on the ground using Total Station
8. Prolong a straight line using Total Station
9. Calculate of area of a given land using Total Station
10. Calculate the volume of earth work using Total Station

State Board of Technical Education and Training, Telangana
Semester End Examination Model Question paper
DCE IV Semester Examination

Corse Code:18C-408P

Duration:2 hours

Course Name: Modern Surveying Lab

Max.Marks:40 Marks

Instructions to the Candidate:

Pick and Answer any One of the following Questions from given list.

Each question carries 40 Marks

1. Perform Traversing with Electronic theodolite for the given stations.
2. Determine the horizontal distance of a point from the instrument station by EDM
3. Calculate of area of a given land using Total Station
4. Give Marking plan of a building on the ground using Total Station
5. Calculate the volume of earth work using Total Station
6. Determine the Co-ordinates (latitude, longitude and Altitude) for various points on the ground using G.P.S.
7. Navigate to given fixed point on the earth using G.P.S
8. Calculate the area of a given land using G.P.S
9. Perform the Digitization of any given contour map
10. Perform the Digitization of given town map and creating different layers for roads, railways, water supply lines and drainage lines

Department of Technical Education

State Board of Technical Education & Training (TS)

Course Title:	Civil Engineering Workshop	Course Code :	18C-409P
Semester:	IV Semester	Course Group :	Practical
Teaching Scheme in Periods(L:T:P):	15:0:30	Credits :	1.5
Methodology :	Lecture+ Practical	Total Contact Periods :	45Periods
CIE :	60 Marks	SEE :	40 Marks

Pre requisites

Basic Knowledge on tools required for carpentry, bar bending, plastering, plumbing, electrical exercises

Course outcomes

After completion of the course, the student shall be able to

CO1	Ability to explain about positioning of shuttering and fixing of form work in the field
CO2	Prepare the bar bending schedule for different conditions
CO3	Ability to explain plastering, distempering and plumbing process
CO4	Identify various electrical accessories, earthing method and wiring connections

Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Hours/Periods
1	Scaffolding and Formwork	6
	Bar Bending of steel reinforcement	9
2	Plastering	3
	Distempering	3
	Plumbing exercises	9
3	Electrical Exercises	15
Total		45

Course Contents

UNIT 1:

a) Scaffolding and Formwork

Duration:6 Periods(L:2-P:4)

Erection of Scaffolding Material - Position of Shuttering - Fixing of form work.

b) Bar Bending of steel reinforcement

Duration:9 Periods(L:3-P:6)

Preparation of bar bending schedule - Bar bending with bar bending schedule - Method of bar bending for Earthquake resistant structures - Field visit to automated bar bending

UNIT 2:

a) Plastering

Duration:3Periods(L:1-P:2)

Preparation of plastering mix proportions - Plastering to walls

b) Distempering

Duration:3 Periods(L:1-P:2)

Preparation of distempering - Application of Distempering

c) Plumbing exercises

Duration:9 Periods(L:3-P:6)

Thread cutting on GI/PVC pipes - Assembling of pipe lines for toilet with two taps, shower and wash basin - Fixing of floor traps, gully traps, water closet, drain pipes - Laying stoneware/PVC pipes and construction of inspection chambers

UNIT 3:

Electrical Exercises

Duration: 15 Periods(L:5 – P:10)

Identify various electrical accessories - Identify line, neutral and earth terminals in power sockets and power plugs - Measure the AC voltage between line and neutral using DMM - Study of earthing and earth pit - Connecting a fuse in the main circuit - Controlling the lamp using a switch - Controlling the fan with a switch and regulator - Connect a i) 2-pin socket ii) 2-pin socket with switch control - Control one lamp with 2 switches (Staircase wiring).

KEY Competencies to be achieved by the student

S. No	Experiment Title	Key Competency
1	Fixing of scaffolding	• Measuring lengths of props accurately • Fixing braces at required locations correctly to support various other scaffolding members • Choosing suitable size of members to support load coming over the scaffolding
	Positioning of form work	• Adjusting the lengths of props correctly to support the weight of RCC elements • Fixing up of various elements of form work firmly to support the weight of RCC elements
2	Bar Bending of steel reinforcement	• Cutting of rods to the suitable lengths correctly • Maintaining the angle of cranking correctly • Maintaining required spacing of rods as per the design and drawings provided
3	Plastering	• Using appropriate Materials and tools • Selection of suitable Mix proportions
4	Distempering	• Using appropriate Materials and tools • Application of distempering
5	Plumbing Exercises	• Using appropriate tools • Selection of suitable pipe specials • Making connections to various sanitary installations
6	Electrical Exercises	• Adopting suitable type of electrical fixtures for intended usage • Using suitable material in required quantities for making earthing for an electrical installation

Reference Books

1. Electrical estimation and costing
2. Basic Plumbing with illustrations by Howard C Massey Craftsman Book Co
3. Workshop Technology by B.S.Raghuwansh, Dhanpat Rai and sons, New Delhi

Suggested E- Learnings

<http://nptel.ac.in>

Suggested Learning Outcomes

After completion of the course, the student shall be able to

- 1.1 State various components of scaffolding
- 1.2 State precautions to be taken while erecting scaffolding
- 1.3 Explain the method of fixing various elements of scaffolding
- 1.4 State precautions to be taken to fix the various elements of scaffolding at required position.
- 1.5 Connect various elements of scaffolding.
- 1.6 Study various aspects of form work to be considered while fixing various elements
- 1.7 Explain the method of fixing of form work at required position for various elements of building construction
- 1.8 Connect various elements of formwork.
- 1.9 Identify various tools used for bending of reinforcing bars.
- 1.10 Read the data required from bar bending schedule for bending of bars.
- 1.11 Mark the salient points of location of bending on the bars as per the bar bending schedule.
- 1.12 Bend the bars using the specified tools to the exact shape as per bar bending schedule as specified in IS-2502(Code of practice for bending and fixing of bars for concrete reinforcement)
- 1.13 Prepare the grills as per the drawings of the structural elements using binders, stirrups, links etc., appropriate to the element.
- 2.1 Understanding materials and tools involved in plastering

- 2.2 Different types of plastering and their applications
- 2.3 Preparation of plastering mix proportions
- 2.4 Understanding materials and tools involved in distempering
- 2.5 Different types of distempering and their applications
- 2.6 Preparation and application of distempering to wall, doors and windows etc.
- 2.7 Identify the different pipe specials and state their functions
- 2.8 Practice thread cutting on PVC/GI pipes
- 2.9 Assemble the pipe line for toilet block with taps, showers and wash basins using specific pipespecials.
- 2.10 Fix the floor trap, gully trap and water closet of a house to the drainage pipes.
- 3.1 Identity various electrical accessories, Wires and cables
 - i) Mains switch
 - ii) MCB
 - iii) Fuse
 - iv) Switches (SPST SPDT)
 - v) Rotary switch
 - vi) Push Button Switches
 - vii) Pin Sockets
 - viii) 3pin /Power sockets
- 3.2 Identify line, neutral and earth terminals in power sockets and power plugs by physical observation and using Tester. Use of test lamp
- 3.3 Identify different wires and cables
- 3.4 Know the wire gauge
- 3.5 Specifications of electrical wires
 - i) VIR, PVC, TRS wires
 - ii) Flexible wires and cables
 - iii) Power cords.
- 3.6 Study of earthing and earth pit
- 3.7 Connect a fuse in the main circuit
- 3.8 Know the metals suitable for fuse wire
- 3.9 Selecting a correct fuse wire rating for a given electrical load
- 3.10 Connect a low current (3A) MCB in the circuit and testing
- 3.11 Control the lamp using a switch

- 3.12 Control the fan with a switch and regulator
- 3.13 Connect a i) 2-pin socket ii) 2-pin socket with switch control
- 3.14 Control one lamp with 2 switches (Staircase wiring)
- 3.15 Know Power consumption of various Appliances like
 - i) Tungsten Lamp
 - ii) CFL Lamp
 - iii) Fan.
 - iv) Fluorescent lamps (Tube Lights).
- 3.16 Estimate the total connected load
- 3.17 Electrical estimation and costing

Suggested Student Activities

1. Prepare a report on tools required, process of plastering and mortar mix preparation for Plastering.
2. Prepare a report on bar bending schedule for any residential building from structural Drawing.
3. Make a presentation on tool required and function of each tool in bar bending process.
4. Visit local construction site and prepare a report on types and process of scaffolding used.
5. Prepare a report on plumbing tools and their functions in plumbing process
6. Prepare a report on fixing of floor trap, gully trap and water closet of a house at near by construction site.
7. Prepare a report on electrical accessories, Wires and cables.
8. Prepare a report on how the lights are controlled in nearby godown.
9. Prepare a report on house wiring of your house.

CO-PO Mapping Matrix

	Basic knowledge	Discipline Knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & sustainability	Ethics	Individual and Team work	Communication	Lifelong learning	Linked PO
CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	
CO1	3	2	3	2				1	2		1,2,3,4,8,9
CO2	3	2	3	3				2	2		1,2,3,4,8,9
CO3	2	3	3	3				3	1	2	1,2,3,4,8,9,10
CO4	1	3	3	3				3	1		1,2,3,4,8,9

State Board of Technical Education and Training, Telangana
MID SEM-I Examination
Model Question paper
DCE IV Semester

Course Code: 18C-409P

Duration: 1 hour

Course Name: Civil Engineering Workshop

Max. Marks: 20 Marks

Instructions to the Candidate:

Pick and Answer any One of the following Questions from given lot.

Each question carries 20 Marks

1. Explain the method of fixing of form work at various elements of scaffolding.
2. Identify the various tools used for bending of reinforcing bars.
3. Bend the bars using specified tools to the exact shape as per the bending schedule.
4. Mark the salient points location of bending on the bars as per the bar bending schedule.

State Board of Technical Education and Training, Telangana
MID SEM-II Examination
Model Question paper
DCE IV Semester

Course Code: 18C-409P

Duration: 1 hour

Course Name: Civil Engineering Workshop

Max. Marks: 20 Marks

Instructions to the Candidate:

Pick and Answer any One of the following Questions from given lot

Each question carries 20 Marks

1. Explain the preparation and application of distempering to wall, doors and windows.
2. Explain the preparation of plastering mix proportions.
3. Prepare the stirrups of the structural element with an approximate dimension.
4. Explain the various tools and materials with proportions involved in plastering.
5. Explain the various tools and materials involved in distempering.
6. Explain different types of distempers and their application

State Board of Technical Education and Training, Telangana
Semester End Examination Model Question paper
DCE IV Semester End Examination

Corse Code:18C-409P

Duration:2 hours

Course Name: Civil Engineering Workshop

Max.Marks:40 Marks

Instructions to the Candidate:

Pick and Answer any One of the following Questions from given lot.

Each question carries 40 Marks

1. Explain the method of fixing of form work at various elements of scaffolding.
2. Bend the bars using specified tools to the exact shape as per the bending schedule.
3. Mark the salient points location of bending on the bars as per the bar bending schedule.
4. Explain the preparation and application of distempering to wall, doors and windows.
5. Explain the preparation of plastering mix proportions.
6. Prepare the stirrups of the structural element with an approximate dimension.
7. Explain the various tools and materials with proportions involved in plastering.
8. Explain the various tools and materials involved in distempering.
9. Explain different types of distempers and their application

Advanced Communication Skills and Life Skills

Course Title	Advanced Communication Skills and Life Skills	Course Code	18 C-410 P
Semester	IV	Course Group	Foundation
Teaching Scheme in Periods- L:T:P	15:0:30	Credits	1.5
Methodology	Lecture + Practical	Total Contact Hours	45 Periods (3 Periods per Week)
CIE	60 Marks	SEE	40 Marks

Rationale:

This course is designed to impart writing skills and employability skills to the students of diploma which will help them in obtaining and maintaining the employment.

Prerequisites:

This course requires the basic knowledge of vocabulary, grammar and four language learning skills, viz. Listening, Speaking, Reading and Writing.

Course Outcomes:

Modules	At the end of the course the students will have the ability to:
Presentation Skills	Prepare a presentation. Use presentation aids effectively. Develop public speaking skills. Learn to make PowerPoint Presentations effectively. Present a Paper using appropriate body language.
Writing Reports	Learn kinds of reports. Learn the format of a report. Organise ideas. Develop essential vocabulary useful to write scientific and technical reports.
Interview Skills	Learn the techniques to face an interview. Learn the etiquette to communicate with employers. Learn the dos and don'ts of an interview. Learn the frequently asked questions in interviews. Use appropriate body language.

	Learn to face interviews telephonically. Gain the confidence to face an interview by attending mock interview.
Group Discussion	Learn the dos and don'ts of a Group Discussion. Participate in a Group Discussion in a healthy manner. Use effective non-verbal communication. Use appropriate phrases and expressions useful in a group discussion.
Workplace Awareness	Learn workplace etiquette. Identify the knowledge, skills and attributes useful at workplace. Build strong workplace relationships. Learn professional ethics. Understand gender equality at the workplace Develop a sense of responsibility towards the society.
Writing Skills Useful at Workplace	Learn various writing formats useful at workplace. Develop an ability to apply technical information in documentation. Revise and edit written documents effectively. Develop corresponding skills - learn the kinds of business letters - the format of a business letter. Learn effective e-mail writing skills. Learn Business Memos. Learn Notes and Narratives. Learn Forms and Applications. Prepare templates for different purposes. Prepare an agenda of a meeting. Prepare the minutes of a meeting. Prepare Notices / Circulars for various purposes. Prepare Press release.

CO-PO Matrix

	Course Outcome		Linked PO
CO 1	Making effective presentations	R/U/A	1, 2, 3,4, 5,6,7,8,9,10
CO 2	Writing scientific and technical reports	R/U/A	1,2,3,4, 5,6,7,8,9,10
CO 3	Learn to face oral and telephonic interviews	R/U/A	1,2,3,4, 7,9,
CO 4	Learn to face group discussion	R/U/A	1,2,3,7,8,9
CO 5	Learn to write various formats useful at workplace	R/U/A	1,2,3,5,7,8,9,10
CO6	Learn workplace etiquette and ethics	R/U/A	1,2,3,7,8,9,10

Course Contents:

I. Presentation Skills	Duration: 6 periods
II. Writing Reports	Duration: 9 periods
III. Interview Skills	Duration: 9 periods
IV. Group Discussion	Duration: 6 periods
V. Workplace Awareness	Duration: 6 periods
VI. Writing Skills Useful at Workplace	Duration: 9 periods

Suggested Student Activities:

- Paper Presentations
- Seminars
- Mock Interviews
- Telephonic Interviews
- Group Discussions
- Role Plays
- Creating advertisements
- Five-minute activities
- Creating a model of workplace

Evaluation Pattern:

I. Continuous Internal Examination:

60 Marks

- a. **Mid Sem - I** 20 marks
 - Syllabus:
 - i. Presentation Skills
 - ii. Writing Reports
- b. **Mid – II:** 20 Marks
 - Syllabus:
 - i. Interview Skills
 - ii. Group Discussion
- c. **Internal assessment:** 20 marks
 - i. Seminars: 10 marks
 - ii. Assignments: 5 marks
 - iii. Lab record submission: 5 marks

II. Semester End Examination :

40 Marks

- a. Write an essay on a given topic or participate in an activity: 15 Marks
- b. Interview or Group Discussion: 15 Marks
- c. *Viva Voce* 10 marks

References:

- Adair, John. *Effective Communication*. London: Pan Macmillan Ltd., 2003.
- Ajmani, J. C. *Good English: Getting it Right*. New Delhi: Rupa Publications, 2012.
- Amos, Julie-Ann. *Handling Tough Job Interviews*. Mumbai: Jaico Publishing, 2004.
- Collins, Patrick. *Speak with Power and Confidence*. New York: Sterling, 2009.
- Fensterheim, Herbert and Jean Baer. *Don't Say Yes When You Want To Say No*. New York: D
- Raman, Meenakshi & Sangeeta Sharma. *Technical Communication: Principles and Practice*. Second Edition. New Delhi: Oxford University Press, 2011

E-Learning Resources:

- <http://www.dailywritingtips.com/>
- <http://www.englishdaily626.com/c-errors.php>
- <http://www.owlnet.rice.edu/~cainproj/>
- <http://www.thehumorsource.com/>
- <http://www.indiabix.com/group-discussion/topics-with-answers/>
- <http://networketiquette.net/>
- <https://public.wsu.edu/~brians/errors>
- <http://www.bbc.co.uk/worldservice/learningenglish/radio/specials/15>

BOARD DIPLOMA EXAMINATION (C-18)
FOURTH SEMESTER COMMON-410P
ADVANCED COMMUNICATION SKILLS AND LIFE SKILLS

MID SEM - I

Time : 1 Hour

Total Marks: 20 Marks

Part – A

10 marks

Instruction: Answer any one of the following questions.

1. Write the guidelines for preparing a PowerPoint presentation.
2. How do you prepare yourself for presenting a technical paper?
3. Mention a few presentation aids and how do you use them effectively?

Part – B

10 marks

Instruction: Answer any one of the following questions.

4. Write the format of a report and describe it.
5. Write a report on the accident you have seen recently.
6. Give the outline of a project report and describe it.

BOARD DIPLOMA EXAMINATION (C-18)
FOURTH SEMESTER COMMON-410P
ADVANCED COMMUNICATION SKILLS AND LIFE SKILLS
MID SEM - II

Time : 1 Hour

Total Marks: 20 Marks

Part – A

10 marks

Instruction: Answer any one of the following questions.

1. What are the dos and don'ts for a formal interview?
2. What at least ten frequently asked questions in a formal interview?
3. How do you prepare for a telephonic interview?

Part – B

10 marks

Instruction: Answer any one of the following questions.

4. What are the dos and don'ts of a group discussion?
5. Mention some phrases and expressions commonly used in a group discussion.
6. Write a short paragraph on the steps you take while participating in a group discussion.

BOARD DIPLOMA EXAMINATION (C-18)
FOURTH SEMESTER 18 COMMON-410P
ADVANCED COMMUNICATION SKILLS AND LIFE SKILLS
SEMESTER END EXAM

Time : 3 Hours

Total Marks: 40 Marks

Part – A

10 marks

Instruction: Pick any one question from the given lot.

1. Prepare the outline of a project report and describe it.
2. Write the guidelines for preparing the slides of a PowerPoint presentation.
3. Write the minutes of the meeting conducted at the Principal's chamber to conduct the annual day celebrations. Prepare the agenda of the annual day celebrations.
4. Describe the workplace etiquette.
5. Prepare a press note for the '*Job Mela*' which is going to be conducted at your institute.

Part – B

15 marks

6. Interview / Group Discussion

Part – C

15 marks

7. *Viva Voce*

Course Title:	Skill Upgradation	Course Code :	---
Semester:	IV Semester	Course Group :	Practical
Teaching Scheme in Periods(L:T:P):	0:0:105	Credits :	2.5
Type of Course :	Practicals	Total Contact Periods :	105Periods

SKILL UPGRADATION ACTIVITIES

1. Visit nearby New layout under construction and collect details of sewerage system and give presentation outlining the measures for improvement.
2. Calculate the Maximum Bending moment in the beams and loads transferred to each column of the famed structure in your class room and write a report.
3. Make a visit to the construction site and study the requirement of labor for a particular item of work and compare it with the SSR by doing Rate analysis.
4. Prepare a detailed estimate for ongoing construction of hospital building to be compared during execution and after completion of project.
5. Visit and submit a report on the usage of notches and weirs in a nearby canal/irrigation structure/dam site.
6. Visit to nearby lakes or irrigation tanks, study its present status, suggest restoration measures and prepare a report.
7. Visit nearby agricultural field where micro irrigation techniques are implemented and prepare a report on water requirements of various crops and increase in water use efficiency.
8. Visit a nearby power hydroelectric project and prepare a report on the types of turbines used
9. Notice the pumps used in your college and hospital for various purposes and prepare a report
10. Prepare a 3D model of various Irrigation structures such as Canal drop, Surplus Weir in CAD software

11. Develop an action plan for construction of rain water harvesting structures for ground water recharge in your institution.
12. Prepare a topographical map of the given area using Total Station and give presentation.
13. Prepare a report on any one of the following.
 1. Aerial survey
 2. Photogrammetric survey
 3. Hydrographic survey,
 4. Military survey
 5. Mine survey.
14. Visit local construction site and prepare a detailed report on fixing of form work to various elements of the building.
15. List out the methods to find complementary function and explain to solve a homogeneous Linear Differential equation.
16. List out the methods to find Particular integrals and explain the solution of Non-homogeneous Linear Differential equations.
17. Write short notes on expansion of simple functions as a Fourier series.
18. Prepare a presentation on Laplace Transforms of simple functions.
19. Prepare a presentation on Inverse Laplace Transforms of simple functions.
20. List out different applications of Laplace Transforms.
21. Solve the Differential equation by applying Laplace Transformations.

Rubrics for Activity assessment (Mathematics)

CATEGORY	4	3	2	1
Mathematical Concepts	Explanation shows complete understanding of the mathematical concepts used to solve the problem(s).	Explanation shows substantial understanding of the mathematical concepts used to solve the problem(s).	Explanation shows some understanding of the mathematical concepts needed to solve the problem(s).	Explanation shows very limited understanding of the underlying concepts needed to solve the problem(s) OR is not written.
Procedures	Typically, uses an efficient and effective procedure to solve the problem(s).	Typically, uses an effective procedure to solve the problem(s).	Sometimes uses an effective procedure to solve problems, but does not do it consistently.	Rarely uses an effective procedure to solve problems.
Explanation	Explanation is detailed and clear.	Explanation is clear.	Explanation is a little difficult to understand, but includes critical components.	Explanation is difficult to understand and is missing several components OR was not included.
Working with Others	Student was an engaged partner, listening to suggestions of others and working cooperatively throughout lesson.	Student was an engaged partner but had trouble listening to others and/or working cooperatively.	Student cooperated with others, but needed prompting to stay on-task.	Student did not work effectively with others.
Mathematical Errors	90-100% of the steps and solutions have no mathematical errors.	Almost all (85-89%) of the steps and solutions have no mathematical errors.	Most (75-84%) of the steps and solutions have no mathematical errors.	More than 75% of the steps and solutions have mathematical errors.

Note:

- 1. The above activities are indicative. The teacher may assign any other activity relevant to the course based on resources available.**
- 2. Rubrics for student activities can be generated by subject teacher**
- 3. The above student activities will be assessed using rubrics. A sample rubrics template is given below. The subject teacher can assess students using rubrics with atleast four relevant aspects.**

RUBRICS MODEL (For assessing Presentation skills)

Aspects	Needs improvement	Satisfactory	Good	Exemplary
Collection of data	Collects very limited information	Collect much Information with very limited relevance to the topic	Collects some basic information with little bit of irrelevance	Collects a great deal of information with relevance
Presentation of data	Clumsy presentation of data	Presents data well; but presentation needs to be more meaningful	Presents data well but need to improve clarity	Presents data in an understandable yet concise manner
Fulfill team's roles & duties	Performs very little duties but Unreliable.	Performs very little duties and is inactive	Performs nearly all duties	Performs all duties of assigned team roles
Shares work equally	Rarely does the assigned work; often needs reminding	Usually does the assigned work; rarely needs reminding	Normally does the assigned work	Always does the assigned work without having to be reminded
Interaction with other team mates	Usually does most of the talking; rarely allows others to speak	Talks good; but never show interest in listening to others	Listens, but sometimes talks too much	Listens and speaks a fair amount
Audibility and clarity in speech	Hardly audible and unclear	Very little audibility and clarity	Audible most of the time with clarity	Audible and clear
Understanding content	Lacks content understanding and is clearly a work in progress	Little depth of content understanding	Some depth of content understanding is evident but needs improvement	Insight and depth of content understanding are evident
Content Presentation	Content is inaccurate and information is not presented in a logical order making it difficult to follow	Content is accurate and information is not presented in a logical order making it difficult to follow	Content is accurate but some information is not presented in a logical order but is still generally easy to follow	Content is accurate and information is presented in a logical order

Suggested additional aspects for assessing Leadership Qualities:

1. Carrying self
2. Punctuality
3. Team work abilities
4. Moral values
5. Communication skills
6. Ensures the work is done in time

Suggested additional aspects for assessing “Participation in social task”

- 1 Interested to know the current situation of society.
- 2 Shows interest to participate in given social task.
- 3 Reliable
- 4 Helping nature
- 5 Inter personal skills
- 6 Ensures task is completed

Suggested additional aspects for assessing “Participation in Technical task”

1. Updated to new technologies
2. Identifies problems in society that can be solved using technology
3. Interested to participate in finding possible technical solutions to identified project
4. Reliable
5. Interpersonal skills

Suggested additional aspects for Carrying Self:

- 1 Stand or sit straight.
- 2 Keep your head level.
- 3 Relax your shoulders.
- 4 Spread your weight evenly on both legs.
- 5 If sitting, keep your elbows on the arms of your chair, rather than tightly against your sides.
- 6 Make appropriate eye contact while communicating.
- 7 Lower the pitch of your voice.
- 8 Speak more clearly.