LEVEL :- IV   PROGRAM : CIVIL ENGINEERING
COURSE CODE :- CEG 401/ CEF 401
COURSE NAME :- ANALYSIS OF STRUCTURE
MAX. MARKS :40   TIME :1·30Hrs   DATE :-28/11/ 23

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No.; SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	SQN	SECTION -I	R / U / A	Co CEG 401	Marks
Q.1		Attempt any **FOUR**:			08
	a)	Define core of section.	R	3	
	b)	Draw stress distribution diagram at the base of chimney of uniform section subjected to lateral wind pressure for no tension condition.	U	3	
	c)	Define angle of obliquity.	R	2	
	d)	Calculate slenderness ratio for a column of diameter 100 mm and length 3m with both ends of column hinged	A	4	
	e)	Show redundant frame and deficient frame with neat diagram	A	1	
	f)	Enlist any two assumptions made in Euler's theory of columns.	R	4	
Q.2		Attempt any **FOUR**:			16
	a)	A point in a strained material is subjected to two mutually perpendicular tensile stresses of 200 MPa and 100 MPa. Determine the intensities of normal, shear and resultant stresses on a plane inclined at 30^0 with the axis of minor tensile stress.	A	2	
	b)	A hollow rectangular pier is 1.2m x 0.8m wide outside with 150mm thickness throughout the section. A vertical load of 200 kN is acting in the plane bisecting 1.2 m side at an eccentricity of 150 mm from the axis of pier. Calculate maximum and minimum stress intensities in the section.	A	3	
	c)	Calculate forces in all members of the frame shown in figure 1.	A	1	
	d)	State middle third rule. Calculate core of section for a rectangle of dimensions 230 mm x 110 mm	U	3	
	e)	Calculate forces in members AB, AE, DE and DC of the frame by the method of joints shown in figure 2.	A	1	
	f)	A hollow circular column of 500 mm external diameter and 50 mm thickness is fixed at one end and free at other end. The length of column is 6m. Calculate buckling load by Euler's formula. If FOS is 2, calculate safe load. Take E = 200 GPa.	A	4	
Q.3		Attempt any **FOUR**:			16
	a)	A steel bar of circular cross section 40mm diameter is used as a strut with both the ends are hinged. Determine Minimum length upto which Euler's formula may be applied. Take E= 210 X 10^3 N/mm^2 and yield stress = 210 N/mm^2.	A	4	

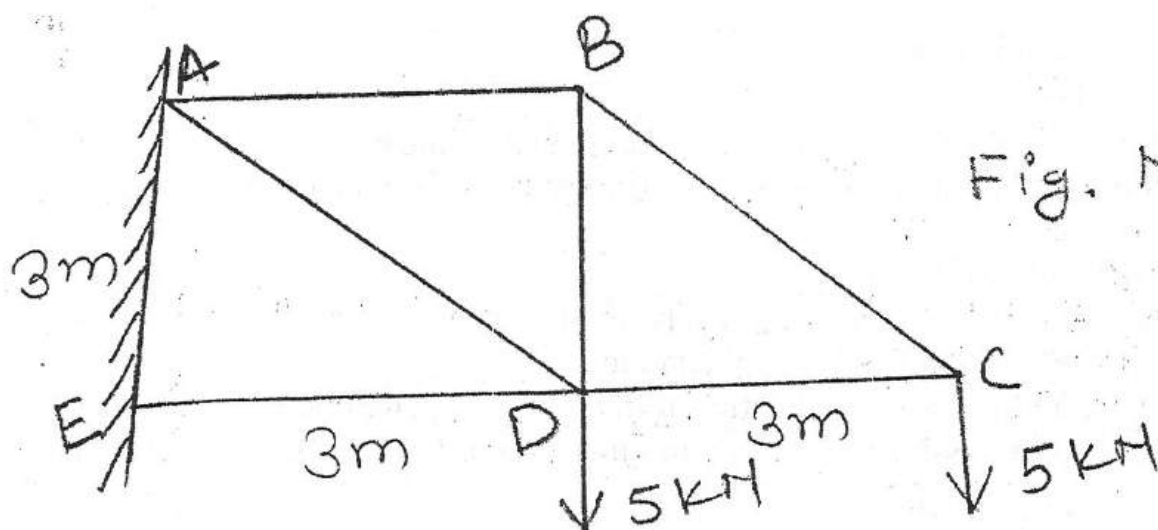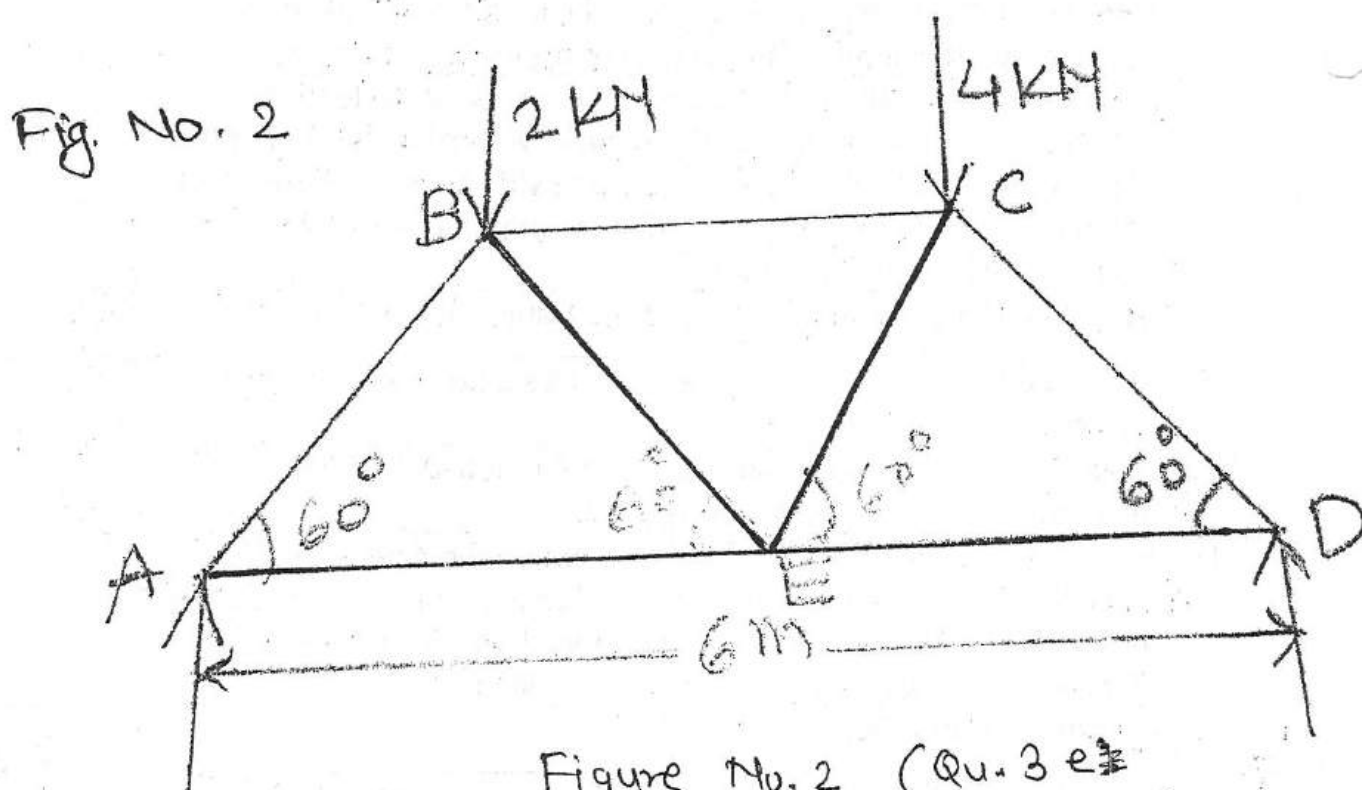|				
b)	Determine Rankine's crippling load for a hollow circular C.I. column of external diameter 80mm and 15mm thickness, length of column is 3m and both the ends of columns are fixed. Take $\sigma_c = 500$ N/mm^2 and $\alpha = 1/1600$.	A	4	

c)	The stresses on two perpendicular planes through a point in a body are 30 Mpa and 15 Mpa both tensile and shear stress 25 Mpa. Determine
	  i) Magnitude and directions of principal stresses
	  ii) Magnitude and directions of maximum shear stress.
		A	2	

d)	A Rectangular column 300mm X 200mm thick carries an axial load of 180 kN in the plane bisecting 200mm side. Calculate the resultant stresses induced at the base. Draw stress distribution diagram.	A	3	
e)	Determine forces in members BC, CE and DE as shown in figure No. 2. Use method of sections	A	1	
f)	Solve Q. 2 a), using Mohr's circle method	A	2	

Figure No. 1 (Qu. 2 c)

Figure No. 2 (Qu. 3 e and Qu. 2 e)

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER/WINTER- 22

EXAM SEAT NO.

LEVEL :- **FOURTH**   PROGRAM : **CIVIL ENGINEERING**
COURSE CODE :- **CEG401/CEF401**
COURSE NAME :- **ANALYSIS OF STRUCTURES**
MAX. MARKS : 40 TIME : 1.30Hrs   DATE :28/11/22

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

P.T.O

QN	SQN	SECTION –II	R/U/A	CEG 401	Marks
Q.4		Attempt any **FOUR**:			**08**
	a)	State the disadvantages of fixed beam.	R	5	
	b)	State meaning and effect of fixity at the support.	U	5	
	c)	Define stiffness factor and distribution factor.	R	5	
	d)	Draw the elastic line for the continuous beam.	R	5	
	e)	State the relation between slope, deflection and radius of curvature.	A	6	
	f)	State two situations where Macaulay's method is used to find slope and deflection of the beam.	R	6	
Q.5		Attempt any **FOUR**:			**16**
	a)	A fixed beam of 4 m span is subjected to two point loads of 5 kN and 10 kN at 1m and 2.8 m from the left support. Calculate fixing end moments.	A	5	
	b)	A fixed beam of span 6 m carries two point loads 30 kN and 'W' kN at 2 m and 5 m from left support respectively. Find W such that fixed end moments at both ends are of same magnitude.	A	5	
	c)	A beam ABC is supported at A, B and C. AB = 6 m, BC = 5 m, AB carries udl of 30 KN/m and BC of 25 KN/m. Calculate the support moments.	A	5	
	d)	State and explain Clapeyron's theorem of three moments having same M.I. and different M.I.writing the expressions for each case.	U	5	
	e)	A wooden cantilever beam of span 2 m has cross section 120 mm wide and 200 mm deep. If a load of 6 kN is acting at a free end, calculate the deflection and slope at the free end. Take E = 100 kN/ mm².	A	6	
	f)	A cantilever beam of span 3 m is subjected to point load of 20 kN at a distance of 2 m from the free end. Cantilever is propped at free end. Find prop reaction.	U	6	
Q.6		Attempt any **TWO**:			**16**
	a)	A continuous beam ABCD having 20 m span subjected to point loads of 40 kN and 50 kN at 3 m and 9 m from support 'A' (left support) respectively. Span AB, BC and CD having length of 6 m,	U	5	

3

		moments.			
	b)	A continuous beam of uniform flexural rigidity is fixed at A and supported over B and C such that AB = 8 m and BC = 6 m. An udl of 10 kN/m acts on AB and point load of 40 kN acts at the center of BC. Using moment distribution method, calculate the support moments and draw BMD.	A	5	
	c)	A horizontal girder of steel having uniform section is 10 m long and is simply supported at its ends. It carries concentrated loads of 120 kN and 80kN at two points 3 m and 4.5 m from the two ends respectively. Moment of inertia for the section of the girder is 16×10^8 mm^4 and E for steel is 2.1×10^5 MPa. Calculate the deflections of girder at a point under 80 kN load.	A	6	

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4

EXAM SEAT NO.

LEVEL : - IV   PROGRAM : CIVIL ENGINEERING

COURSE CODE :- CEG 401 / CEF 401

COURSE NAME :- ANALYSIS OF STRUCTURE

MAX. MARKS :40   TIME :1·30Hrs   DATE :-28/11/ 23

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No.; SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	SQN	SECTION -I	R/U/A	Co CEG 401	Marks
Q.1		Attempt any **FOUR:**			08
	a)	Define core of section.	R	3	
	b)	Draw stress distribution diagram at the base of chimney of uniform section subjected to lateral wind pressure for no tension condition.	U	3	
	c)	Define angle of obliquity.	R	2	
	d)	Calculate slenderness ratio for a column of diameter 100 mm and length 3m with both ends of column hinged	A	4	
	e)	Show redundant frame and deficient frame with neat diagram	A	1	
	f)	Enlist any two assumptions made in Euler's theory of columns.	R	4	
Q.2		Attempt any **FOUR:**			16
	a)	A point in a strained material is subjected to two mutually perpendicular tensile stresses of 200 MPa and 100 MPa. Determine the intensities of normal, shear and resultant stresses on a plane inclined at 30^0 with the axis of minor tensile stress.	A	2	
	b)	A hollow rectangular pier is 1.2m x 0.8m wide outside with 150mm thickness throughout the section. A vertical load of 200 kN is acting in the plane bisecting 1.2 m side at an eccentricity of 150 mm from the axis of pier. Calculate maximum and minimum stress intensities in the section.	A	3	
	c)	Calculate forces in all members of the frame shown in figure 1.	A	1	
	d)	State middle third rule. Calculate core of section for a rectangle of dimensions 230 mm x 110 mm	U	3	
	e)	Calculate forces in members AB, AE, DE and DC of the frame by the method of joints shown in figure 2.	A	1	
	f)	A hollow circular column of 500 mm external diameter and 50 mm thickness is fixed at one end and free at other end. The length of column is 6m. Calculate buckling load by Euler's formula. If FOS is 2, calculate safe load. Take E = 200 GPa.	A	4	
Q.3		Attempt any **FOUR:**			16
	a)	A steel bar of circular cross section 40mm diameter is used as a strut with both the ends are hinged. Determine Minimum length upto which Euler's formula may be applied. Take E= 210 X 10^3 N/mm^2 and yield stress = 210 N/mm^2.	A	4	

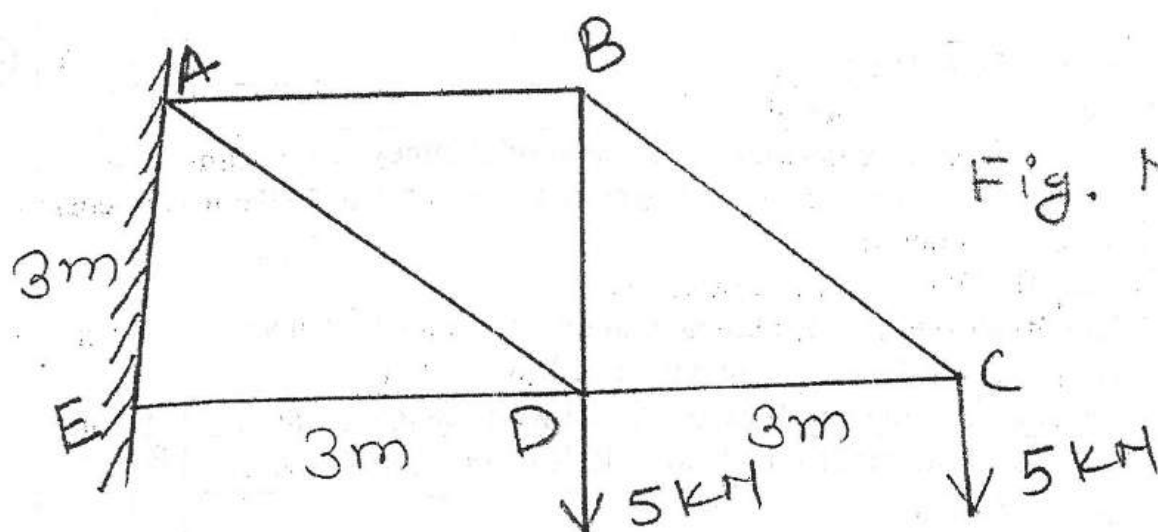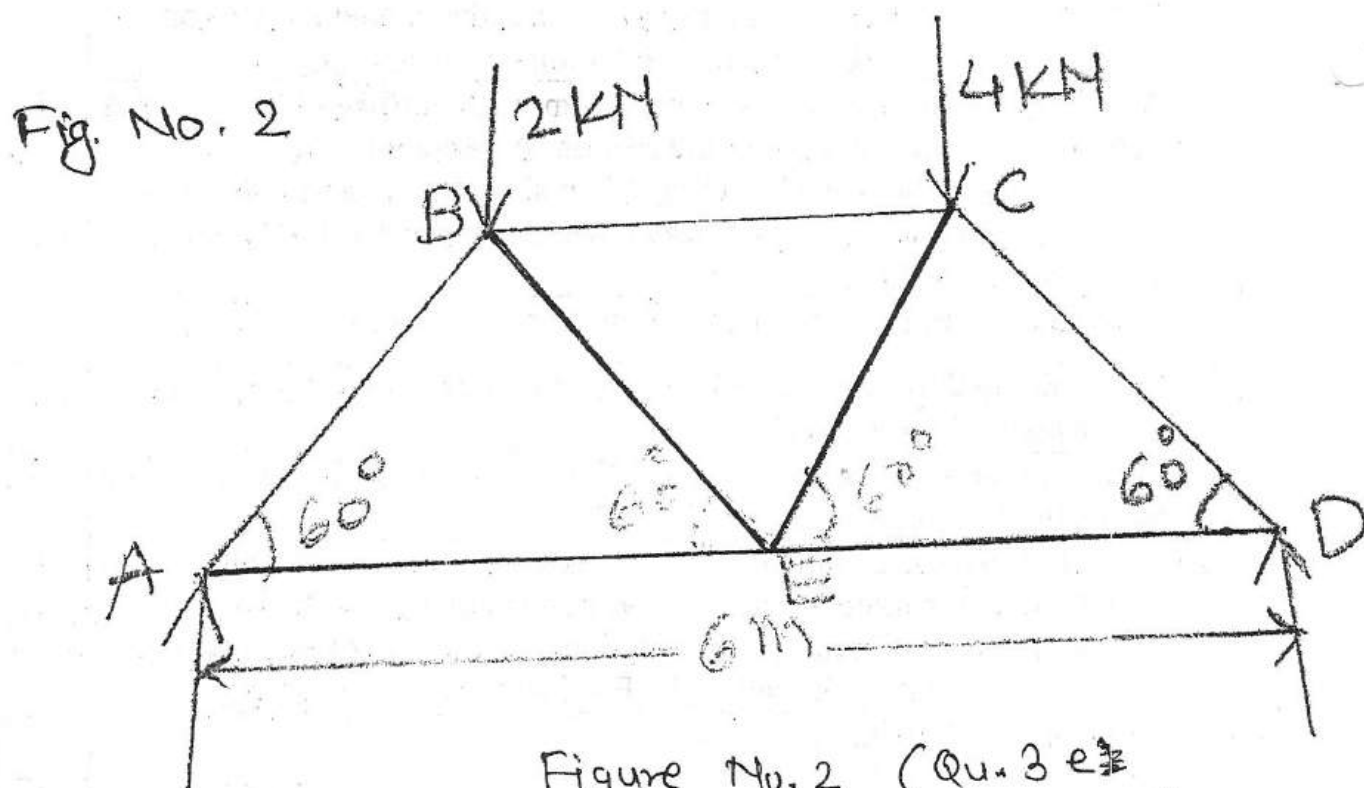					
b)	Determine Rankine's crippling load for a hollow circular C.I. column of external diameter 80mm and 15mm thickness, length of column is 3m and both the ends of columns are fixed. Take $\sigma_c = 500$ N/mm^2 and $\alpha = 1/1600$.	A	4	

c)	The stresses on two perpendicular planes through a point in a body are 30 Mpa and 15 Mpa both tensile and shear stress 25 Mpa. Determine
	     i) Magnitude and directions of principal stresses
	     ii) Magnitude and directions of maximum shear stress.
		A	2	

d)	A Rectangular column 300mm X 200mm thick carries an axial load of 180 kN in the plane bisecting 200mm side. Calculate the resultant stresses induced at the base. Draw stress distribution diagram.	A	3	
e)	Determine forces in members BC, CE and DE as shown in figure No. 2. Use method of sections	A	1	
f)	Solve Q. 2 a), using Mohr's circle method	A	2	

Figure No. 1 (Qu. 2c)

Figure No. 2 (Qu. 3 e and Qu. 2 e)

LEVEL : - FOURTH   PROGRAM : CIVIL ENGINEERING
COURSE CODE :- CEG401/CEF401
COURSE NAME :- ANALYSIS OF STRUCTURES
MAX. MARKS : 40 TIME : 1·30Hrs   DATE : 28 /11 / 22

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

P.T.O

QN	SQN	SECTION –II	R/ U/ A	CEG 401	Marks
Q.4		Attempt any **FOUR**:			08
	a)	State the disadvantages of fixed beam.	R	5	
	b)	State meaning and effect of fixity at the support.	U	5	
	c)	Define stiffness factor and distribution factor.	R	5	
	d)	Draw the elastic line for the continuous beam.	R	5	
	e)	State the relation between slope, deflection and radius of curvature.	A	6	
	f)	State two situations where Macaulay's method is used to find slope and deflection of the beam.	R	6	
Q.5		Attempt any **FOUR**:			16
	a)	A fixed beam of 4 m span is subjected to two point loads of 5 kN and 10 kN at 1m and 2.8 m from the left support. Calculate fixing end moments.	A	5	
	b)	A fixed beam of span 6 m carries two point loads 30 kN and 'W' kN at 2 m and 5 m from left support respectively. Find W such that fixed end moments at both ends are of same magnitude.	A	5	
	c)	A beam ABC is supported at A, B and C. AB = 6 m, BC = 5 m, AB carries udl of 30 KN/m and BC of 25 KN/m. Calculate the support moments.	A	5	
	d)	State and explain Clapeyron's theorem of three moments having same M.I. and different M.I.writing the expressions for each case.	U	5	
	e)	A wooden cantilever beam of span 2 m has cross section 120 mm wide and 200 mm deep. If a load of 6 kN is acting at a free end, calculate the deflection and slope at the free end. Take E = 100 kN/ mm².	A	6	
	f)	A cantilever beam of span 3 m is subjected to point load of 20 kN at a distance of 2 m from the free end. Cantilever is propped at free end. Find prop reaction.	U	6	
Q.6		Attempt any **TWO**:			16
	a)	A continuous beam ABCD having 20 m span subjected to point loads of 40 kN and 50 kN at 3 m and 9 m from support 'A' (left support) respectively. Span AB, BC and CD having length of 6 m,	U	5	

		moments.			
	b)	A continuous beam of uniform flexural rigidity is fixed at A and supported over B and C such that AB = 8 m and BC = 6 m. An udl of 10 kN/m acts on AB and point load of 40 kN acts at the center of BC. Using moment distribution method, calculate the support moments and draw BMD.	A	5	
	c)	A horizontal girder of steel having uniform section is 10 m long and is simply supported at its ends. It carries concentrated loads of 120 kN and 80kN at two points 3 m and 4.5 m from the two ends respectively. Moment of inertia for the section of the girder is 16×10^8 mm^4 and E for steel is 2.1×10^5 MPa. Calculate the deflections of girder at a point under 80 kN load.	A	6	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.
(An Autonomous Institute of Govt. Of Maharashtra)
WINTER/SUMMER- 2023
EXAM SEAT NO.

LEVEL : - FIFTH   PROGRAM : CIVIL ENGINEERING
COURSE CODE :- CEG 503
COURSE NAME :- CONSTRUCTION MANAGEMENT
MAX. MARKS : 40   TIME : 1·30 Hrs   DATE :- 28/11/23

QN	SQN	SECTION –II	R/U/A	CEG 503	Marks
Q.4		Attempt any **FOUR**:			08
	a)	State any two objectives of employee training.	R	04	
	b)	Define personal policy.	R	04	
	c)	What do you mean by JIT and ERP ?	R	05	
	d)	Give any two precautions to be taken while stacking of cement bags at site.	A	05	
	e)	Define work measurement.	R	06	
	f)	State the concept of productivity.	R	06	
Q.5		Attempt any **FOUR**:			16
	a)	Explain any four provisions of workmen's compensation act 1924.	R	04	
	b)	Explain any four functions of HR department.	U	04	
	c)	Enlist any eight duties of material manager.	R	05	
	d)	Explain ABC technique of material management.	U	05	
	e)	Explain importance of safety at construction work.	U	06	
	f)	Enlist any four uses of work measurement.	R	06	
Q.6		Attempt any **FOUR**:			16
	a)	Explain recruitment and selection of employees.	U	04	
	b)	State any four labour welfare activities you will do for labour at your construction site.	A	04	
	c)	Define material management. Give its any four objectives.	R	05	
	d)	Draw the flow chart showing stages in work measurement.	A	06	
	e)	State any eight precautions to be taken to avoid accidents at the construction site.	U	06	
	f)	Define method study. State any four objectives of it.	R	06	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER-

EXAM SEAT NO.

LEVEL : - FIFTH   PROGRAM : CIVIL ENGINEERING

COURSE CODE :- CEG503

COURSE NAME :-Construction Management

MAX. MARKS : 40   TIME : 1-20Hrs   DATE :-28/11/23

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	SQN	SECTION -I	R/U/A	Co CEG 503	Marks
Q.1		Attempt any **FOUR**:			08
	a)	Enlist any four agencies associated with construction work.	R	1	
	b)	Enlist any four qualities of leader	R	2	
	c)	List any two benefits of team work.	U	2	
	d)	Enlist any four phases of planning.	R	2	
	e)	State the importance of organizations in various firms	U	2	
	f)	State the significance of critical path	R	3	
Q.2		Attempt any **FOUR**:			16
	a)	Explain in brief stages in construction work	U	1	
	b)	Describe any two objectives of construction management	R	2	
	c)	List fourteen principles of management.	U	2	
	d)	Describe any four hurdles of effective communication.	A	2	
	e)	Explain the types of decision making.	U	2	
	f)	What are the advantages of PERT?	U	3	
Q.3		Attempt any **FOUR**:			16
	a)	Enlist eight stages in construction work.	R	1	
	b)	Enlist any four types of departmentalization. Explain anyone.	R	2	
	c)	Explain in brief work motivation.	U	2	
	d)	Explain the creative effective control.	A	2	
	e)	Explain any one type of organizations with advantages and disadvantages.	U	2	
	f)	Differentiate any four points between CPM and PERT.	A	3	

P.T.O.

LEVEL : - FIFTH PROGRAM : CIVIL ENGINEERING
COURSE CODE :- CEG 503
COURSE NAME :- CONSTRUCTION MANAGEMENT
MAX. MARKS : 40 TIME :1·30 Hrs DATE :- 28/11/23

QN	SQN	SECTION –II	R/U/A	CEG 503	Marks
Q.4		Attempt any **FOUR**:			08
	a)	State any two objectives of employee training.	R	04	
	b)	Define personal policy.	R	04	
	c)	What do you mean by JIT and ERP ?	R	05	
	d)	Give any two precautions to be taken while stacking of cement bags at site.	A	05	
	e)	Define work measurement.	R	06	
	f)	State the concept of productivity.	R	06	
Q.5		Attempt any **FOUR**:			16
	a)	Explain any four provisions of workmen's compensation act 1924.	R	04	
	b)	Explain any four functions of HR department.	U	04	
	c)	Enlist any eight duties of material manager.	R	05	
	d)	Explain ABC technique of material management.	U	05	
	e)	Explain importance of safety at construction work.	U	06	
	f)	Enlist any four uses of work measurement.	R	06	
Q.6		Attempt any **FOUR**:			16
	a)	Explain recruitment and selection of employees.	U	04	
	b)	State any four labour welfare activities you will do for labour at your construction site.	A	04	
	c)	Define material management. Give its any four objectives.	R	05	
	d)	Draw the flow chart showing stages in work measurement.	A	06	
	e)	State any eight precautions to be taken to avoid accidents at the construction site.	U	06	
	f)	Define method study. State any four objectives of it.	R	06	

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LEVEL : - FIFTH   PROGRAM : CIVIL ENGINEERING
COURSE CODE :- CEG503
COURSE NAME :-Construction Management
MAX. MARKS : 40   TIME : 1:30Hrs   DATE :-28/11/23

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	SQN	SECTION -I	R/U/A	Co CEG 503	Marks
Q.1		Attempt any **FOUR**:			08
	a)	Enlist any four agencies associated with construction work.	R	1	
	b)	Enlist any four qualities of leader	R	2	
	c)	List any two benefits of team work.	U	2	
	d)	Enlist any four phases of planning.	R	2	
	e)	State the importance of organizations in various firms	U	2	
	f)	State the significance of critical path	R	3	
Q.2		Attempt any **FOUR**:			16
	a)	Explain in brief stages in construction work	U	1	
	b)	Describe any two objectives of construction management	R	2	
	c)	List fourteen principles of management.	U	2	
	d)	Describe any four hurdles of effective communication.	A	2	
	e)	Explain the types of decision making.	U	2	
	f)	What are the advantages of PERT?	U	3	
Q.3		Attempt any **FOUR**:			16
	a)	Enlist eight stages in construction work.	R	1	
	b)	Enlist any four types of departmentalization. Explain anyone.	R	2	
	c)	Explain in brief work motivation.	U	2	
	d)	Explain the creative effective control.	A	2	
	e)	Explain any one type of organizations with advantages and disadvantages.	U	2	
	f)	Differentiate any four points between CPM and PERT.	A	3	

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER- 2023

EXAM SEAT NO.

LEVEL : - Fourth   PROGRAM : CE

COURSE CODE :- CEG402

COURSE NAME :- DESIGN AND DRAFTING OF RCC STRUCTURES

MAX. MARKS : 80   TIME : 04 Hrs   DATE :- 23 / 11 / 23

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	SQN	SECTION -I	R/U/A	Co	Marks
Q.1		Attempt any **FOUR**:			08
	a)	Define Limit State and enlist the types of Limit State in RCC	R	1	2
	b)	Which are the common grades of concrete and steel that are used for RCC structures?	U	1	2
	c)	Define : i) Characteristic strength ii) Characteristic Load	U	1	2
	d)	State any four situations where doubly reinforced beam sections are preferred.	R	2	2
	e)	Explain reason: flanged beams are preferred than rectangular beam	R	3	2
	f)	State the I.S. specifications for effective flanged width of "T" and "L" beam.	U	3	2
Q.2		Attempt any **TWO**:			16
	a)	i)Draw a neat sketch of INTZE storage reservoir showing components and typical reinforcement. ii) Draw the sketch of retaining wall –cantilever and show steel details.	U	1	8
	b)	Calculate ultimate moment of resistance for a cantilever beam having effective span of 2.5 m and of size 230 mm x 450 mm deep effective. It is reinforced with 6 bars of 12 mm diameter bar on tension side only. Use M 20 concrete and Fe 500 steel. Also determine safe uniformly distributed load the beam can sustain.	A	2	8
	c)	Design the smallest reinforced concrete section for a simply supported beam of 4 m clear span with bearing support of 300 mm. It carries a udl of 30 kN/m including self weight. The width of the beam is 250 mm and reinforced on tension side only. The materials used are M 20 concrete and Fe 415 steel.	A	2	8
Q.3		Attempt any **TWO**:			16
	a)	i) Draw ductile detailing for Beam- column junction as per IS 13920:2000.	U	1	4
		ii) Differentiate between Pretensioning and Post tensioning.	U	1	4
	b)	Design RC rectangular beam of M25 concrete and Fe 415 steel, having b = 300 mm, d = 500 mm, subjected to ultimate bending moment of 350 kNm. Assume dc = 50 mm, fsc = 353 MPa.	A	2	8
	c)	Calculate the ultimate moment of resistance of T-beam having flange width 1350mm, depth of slab 150mm effective depth of beam 600 mm., width of web 250mm. It is reinforced with 4No 22mm and dia. at base with Fe500 steel. Assume M25 concrete.	A	3	8

LEVEL : - FOURTH   PROGRAM : CIVIL ENGINEERING
COURSE CODE :- CEG402
COURSE NAME :- DESIGN & DRAFTING OF RCC STRUCTURE
MAX. MARKS : 80   TIME : **04 Hrs**   DATE :- 29/11/23

QN	SQN	SECTION –II	R/U/A	Co	Marks
Q.4		Attempt any **FOUR**:			**08**
	a)	Write the expression for vertical stirrups spacing in RC beam stating the meaning of each term.	R	4	
	b)	What is torsion and state two situations where torsion is produced.	U	4	
	c)	State the assumptions in limit state of collapse compression any four.	U	6	
	d)	Write the expression for effective span of dog legged stair flight when landing is spanning transverse to stair flight.	R	5	
	e)	State span by effective depth ratio for cantilever and one way slab s/s for spans up to 10m for plain bars.	U	5	
	f)	What is bond stress and state factors on which it depends.	U	6	
Q.5		Attempt any **FOUR**:			**16**
	a)	Find the development length for 20 mm Fe 500 bars in Tension and compression embedded in M25 concrete taking design bond stress as 1.4 MPa.	A	4	
	b)	State critical sections in column footing design and show shear force and loading to be considered .	A	6	
	c)	A column section 250mm $\times$ 250mm is reinforced with 4 -16 mm Fe415 bars, find the ultimate strength of the section and also check for minimum eccentricity if the effective length is 3.0m.	A	6	
	d)	Design the beam for vertical stirrups for a s/s beam carrying UDL of 15kN/m including self weight over 4m span. Use 8 mm stirrups and M20 concrete and Fe415 bars .Assuming steel percentage as 1.25% , τ_c = 0.67 MPa and τ_c max = 2.8 MPa, Take b = 250mm and d =400mm.	A	5	
	e)	Design a slab for a room having clear span 3m × 7m simply supported on walls 230mm thick, all around. Adopt M20 and Fe415 bars. Assume modification factor of 1.4 for steel.	A	5	
	f)	Draw all the forms of shear reinforcements provided in the beam,	U	4	
Q.6		Attempt any **TWO**			**16**
	a)	Design the square footing for a column carrying an ultimate axial load of 1200 kN resting on a soil of SBC 200 kN/sqm.Check the depth for BM only and sketch reinforcement details. Shear checks not required.Adopt M20 and Fe415 steel.	A	6	
	b)	i)Draw the sketch of typical reinforcement detailing of Dog legged staircase flight assuming that flight slab is spanning longitudinally with landing on either side spanning in the same direction. Assume waist slab thickness 120mm, main bars 10mm and distribution steel 8mm Fe415.Landing 1m width, Rise 150mm,Tread 250mm , R=10, T=9. ii) Derive the expression for development for a rod embedded in concrete with usual notations and sketch.	U	5/4	
	c)	Design a s/s slab for a room 4m × 6m resting on 300mm thick on all four sides with corners free to lift . Adopt M20 and Fe415 with modification factor for steel 1.4.αx = 0.102.αy = 0.048 take load inclusive of all loads as 5 kN/sqm.Plot bottom face plan.	A	5	

LEVEL : - **THIRD**   PROGRAM : **CIVIL ENGINEERING**
COURSE CODE :- **CEG 308**
COURSE NAME   **SURVEYING - I**
MAX. MARKS ; **80**   TIME : **03Hrs.**   DATE :- **29/ 11 / 2023**

Instruction :-

1) Answers must be written in the main answer book provided.(and supplements if required)
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	SQN	Question Text	R/U/A	Co CEG 308	Marks
Q.1		Attempt any **FOUR:**			08
	a)	Define plane survey and geodetic survey.	R	1	
	b)	State the classification of survey based on object of survey.	U	1	
	c)	Define well and ill conditioned triangle.	U	2	
	d)	State any two cases of local attraction.	U	3	
	e)	Draw conventional symbol for cutting and embankment.	A	2	
	f)	State the use of hinged sunglass in compass.	U	3	
Q.2		Attempt any **FOUR:**			16
	a)	Explain with sketch the stepping method of measuring the horizontal distance on slopping ground.	U	1	
	b)	Explain the principle of optical square with neat sketch.	U	1	
	c)	Following are the observed fore bearings of the line. Find their back bearings i) $40^0 30'$ ii) $N38^0 30' W$ iii) $169^0 30'$ iv) $N25^0 30' E$.	A	3	
	d)	Explain the principles of surveying with neat sketch.	R	1	
	e)	State the points to be considered while selecting survey stations.	U	2	
	f)	Differentiate between whole Circle Bearing and Reduced Bearing.	A	3	
Q.3		Attempt any **FOUR:**			16
	a)	A 20m Chain was found to be 0.05m too long after chaining 1400m. It was found to be 0.1m too long after chaining 2200m. If the chain was correct before commencement of the work. Find the true distance.	A	1	
	b)	Define the terms : Base line, check line, Tie line, Oblique offset.	R	2	
	c)	State the functions of any four component parts of prismatic compass.	U	3	
	d)	The following bearings were taken in a closed compass traverse survey. Determine the correct bearing. Find station affected by local attraction.	A	3	

Line	FB	BB
AB	$48^0 25$	230^0
BC	$177^0 45'$	356^0
CD	$104^0 15'$	$284^0 55'$
DE	$165^0 15'$	$345^0 15'$
EA	$259^0 30'$	79^0

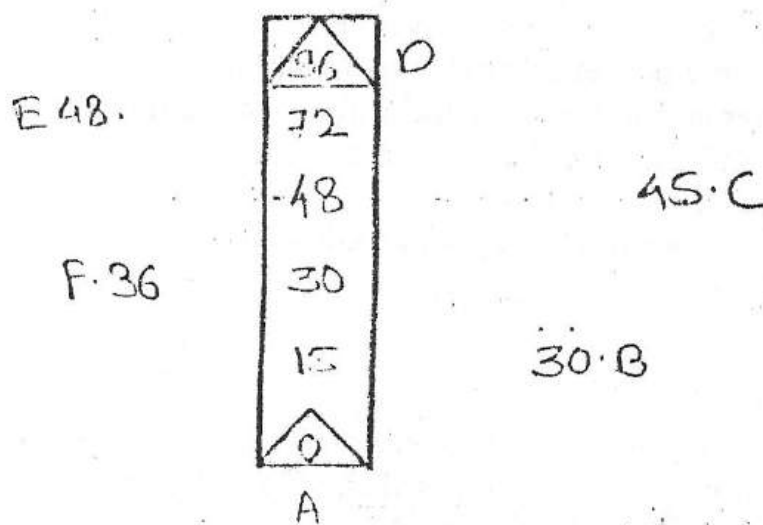|					
e)	Plot the following cross staff survey of a field ABCDEFA and calculate its area. Refer Fig. No. 1		A	2	
f)	Explain the declination of magnetic needle and give its types.		R	3	

E 48.

F. 36

D

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-48

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45·C

30·B

A

Fig No 1

92·c

2|3

Q.4		Attempt any FOUR			08
	a)	Define height of instrument. (HI)	R	4	
	b)	Enlist any two uses of Auto level.	U	4	
	c)	Define counter.	R	5	
	d)	What is mean by horizontal equivalent.	R	5	
	e)	State any two uses of counter map.	U	5	
	f)	State the uses of planimeter.	R	5	
Q.5		Attempt any FOUR			16
	a)	Define the term i) Level surface ii) Horizontal line iii) Vertical line iv) Datum surface.	R	4	
	b)	State and explain temporary adjustment of dumpy level.	U	4	
	c)	Enlist the methods of countering and explain any one of them.	U	5	
	d)	Describe the procedure of measuring area by planimeter.	U	6	
	e)	The following readings were observed successively with leveling instrument. The instrument was shifted after the fifth and eleventh readings. 0.485, 1.210, 1.635, 3.395, 3.775, 0.650, 1.400, 1.795, 2.575, 3.375, 3.895, 1.735, 0.635, 1.605m Determine the RL of various points and shows the entries in level books, if the RL of the first point is 100m, using the Rise and fall method.	A	4	
	f)	Define the terms. i) Back sights ii) Inter sights iii) Fore sights iv) Bench mark	R	4	
Q.6		Attempt any FOUR			16
	a)	Enlist any four characteristics of contair lines.	U	5	
	b)	The following consecutive readings were taken with a level and 4m staff on continuously sloping ground at a common interval of 30m. 0.780, 1.540, 1.960, 2.435, 2.990, 3.485, 1.160, 1.950, 2.365, 3.640, 0.935, 1.050, 1.630, & 2.550 The RL of first point is 300.00m. Role out a page of level field book and calculate RL of all points by height of instrument method. Apply usual checks.	A	4	
	c)	Enlist sources of errors in leveling & explain any one.	U	4	
	d)	Find the height of the tie beam above the floor level from following data RL of floor level = 100.00m Staff reading on floor level = 1.150m Reading on staff held inverted, the bottom touching the underside of the tie beam = 3.450m.	A	4	
	e)	Calculate the area of a figure from following reading. IR = 9.198, FR = 4.524, m = 100cm^2 N = 0 C = 23.52	A	6	
	f)	Enlist the classification of leveling and explain in brief procedure of profile leveling.	U	4	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

ODD TERM END EXAM WINTER -2023

EXAM SEAT NO.

LEVEL : - **THIRD**   PROGRAM : **CIVIL ENGINEERING**
COURSE CODE :- **CEG 308**
COURSE NAME   **SURVEYING - I**
MAX. MARKS : 80   TIME : 03Hrs.   DATE :- 29/ 11 / 2023

Instruction :-

1) Answers must be written in the main answer book provided.(and supplements if required)
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	SQN	Question Text	R/U/A	Co CEG 308	Marks
Q.1		Attempt any **FOUR**:			08
	a)	Define plane survey and geodetic survey.	R	1	
	b)	State the classification of survey based on object of survey.	U	1	
	c)	Define well and ill conditioned triangle.	U	2	
	d)	State any two cases of local attraction.	U	3	
	e)	Draw conventional symbol for cutting and embankment.	A	2	
	f)	State the use of hinged sunglass in compass.	U	3	
Q.2		Attempt any **FOUR**:			16
	a)	Explain with sketch the stepping method of measuring the horizontal distance on slopping ground.	U	1	
	b)	Explain the principle of optical square with neat sketch.	U	1	
	c)	Following are the observed fore bearings of the line. Find their back bearings i) $40^0 30'$ ii) $N38^0 30' W$ iii) $169^0 30'$ iv) $N25^0 30' E$.	A	3	
	d)	Explain the principles of surveying with neat sketch.	R	1	
	e)	State the points to be considered while selecting survey stations.	U	2	
	f)	Differentiate between whole Circle Bearing and Reduced Bearing.	A	3	
Q.3		Attempt any **FOUR**:			16
	a)	A 20m Chain was found to be 0.05m too long after chaining 1400m. It was found to be 0.1m too long after chaining 2200m. If the chain was correct before commencement of the work. Find the true distance.	A	1	
	b)	Define the terms : Base line, check line, Tie line, Oblique offset.	R	2	
	c)	State the functions of any four component parts of prismatic compass.	U	3	
	d)	The following bearings were taken in a closed compass traverse survey. Determine the correct bearing. Find station affected by local attraction.	A	3	

Line	FB	BB
AB	$48^0 25$	230^0
BC	$177^0 45'$	356^0
CD	$104^0 15'$	$284^0 55'$
DE	$165^0 15'$	$345^0 15'$
EA	$259^0 30'$	79^0

	e)	Plot the following cross staff survey of a field ABCDEFA and calculate its area. Refer Fig. No. 1	A	2	
	f)	Explain the declination of magnetic needle and give its types.	R	3	

E 48.

72

·48

45·C

F·36

30

15

30·B

A

Fig No 1

92·e

2/3

Q.4		Attempt any FOUR			08
	a)	Define height of instrument. (HI)	R	4	
	b)	Enlist any two uses of Auto level.	U	4	
	c)	Define counter.	R	5	
	d)	What is mean by horizontal equivalent.	R	5	
	e)	State any two uses of counter map.	U	5	
	f)	State the uses of planimeter.	R	5	
Q.5		Attempt any FOUR			16
	a)	Define the term i) Level surface ii) Horizontal line iii) Vertical line iv) Datum surface.	R	4	
	b)	State and explain temporary adjustment of dumpy level.	U	4	
	c)	Enlist the methods of countering and explain any one of them.	U	5	
	d)	Describe the procedure of measuring area by planimeter.	U	6	
	e)	The following readings were observed successively with leveling instrument. The instrument was shifted after the fifth and eleventh readings. 0.485, 1.210, 1.635, 3.395, 3.775, 0.650, 1.400, 1.795, 2.575, 3.375, 3.895, 1.735, 0.635, 1.605m Determine the RL of various points and shows the entries in level books, if the RL of the first point is 100m, using the Rise and fall method.	A	4	
	f)	Define the terms. i) Back sights ii) Inter sights iii) Fore sights iv) Bench mark	R	4	
Q.6		Attempt any FOUR			16
	a)	Enlist any four characteristics of contair lines.	U	5	
	b)	The following consecutive readings were taken with a level and 4m staff on continuously sloping ground at a common interval of 30m. 0.780, 1.540, 1.960, 2.435, 2.990, 3.485, 1.160, 1.950, 2.365, 3.640, 0.935, 1.050, 1.630, & 2.550 The RL of first point is 300.00m. Role out a page of level field book and calculate RL of all points by height of instrument method. Apply usual checks.	A	4	
	c)	Enlist sources of errors in leveling & explain any one.	U	4	
	d)	Find the height of the tie beam above the floor level from following data RL of floor level = 100.00m Staff reading on floor level = 1.150m Reading on staff held inverted, the bottom touching the underside of the tie beam = 3.450m.	A	4	
	e)	Calculate the area of a figure from following reading. IR = 9.198, FR = 4.524, m = 100cm² N = 0 C = 23.52	A	6	
	f)	Enlist the classification of leveling and explain in brief procedure of profile leveling.	U	4	

3/3

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER/WINTER-

EXAM SEAT NO.

LEVEL : - IV   PROGRAM : CIVIL ENGINEERING

COURSE CODE :- CEG-403 / CEF 403

COURSE NAME :- DESIGN AND DRAFTING OF STEEL STRUCTURE

MAX. MARKS : 80   TIME : 03 Hrs   DATE :- 30/11/23

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

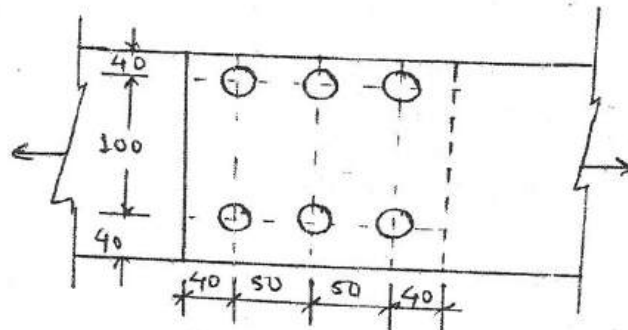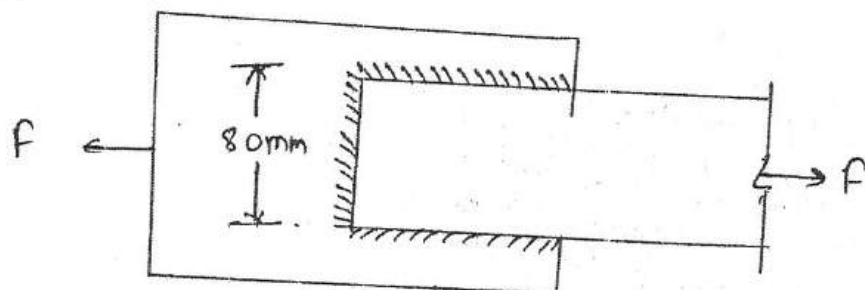| QN	SQN	SECTION -I	R/U/A	Co CEG-403	Marks
Q.1		**Attempt any FOUR:**			08
	a)	Distinguish between gauge distance and pitch of the bolt.	U	2	
	b)	State full form of i) ISJC II) ISLB of rolled steel section.	R	1	
	c)	Enlist any four types of steel structure.	U	1	
	d)	Draw any two typical cross sections of tension member using angle sections	U	3	
	e)	State the various types of tension members.	R	3	
	f)	Define the slenderness ratio (λ)	R	3	
Q.2		**Attempt any FOUR:**			16
	a)	State physical and mechanical properties of structural steel.	R	1	
	b)	Design a lap joint between the two plates each of width 120mm, if the thickness of one plate is 16mm and the other is 12mm. the joint has to transfer a design load of 160KN. Use i) grade of plate- Fe410, ii) grade of bolt- 4.6, iii) diameter of bolt-16mm, iv) edge distance- 30mm, v) pitch distance- 40mm	A	2	
	c)	Two flat plates 180mm x 10mm are connected in a lap joint using 6 bolts of 20mm diameter as shown in fig no1. Determine the strength of plate in tension. Take f_y=250 N/mm^2 and f_u = 410N/mm^2	A	3	
	d)	State the functions of lacing and battening. Draw neat sketches of single lacing and battening.	R	3	
	e)	A strut 2ISA 100x100x6mm, 2.8 m long connected to 10mm thick gusset plate on either side by two bolts at each end. Determine compressive load carrying capacity of angle strut. For ISA 100x100x6 mm - A – 1167mm^2, $I_{xx}=I_{yy}$=111.3x10^4 mm^2, $C_{xx}=C_{yy}$=26.76mm	A	3	
	f)	Explain with neat sketch stress-strain curve with its salient features.	A	1	
Q.3		**Attempt any FOUR:**			16
	a)	State any four types of load to which structure are subjected along with respective relevant codes.	R	1	
	b)	Draw a neat sketch of a) v- butt welded joint b) lap bolted joint	U	2	
	c)	Design a suitable fillet weld to connect a tie bar 80 mm × 8 mm to 10 mm thick gusset plate. Design the joint for full strength of the tie and assume welding on all three sides as shown in figure no. 2 Take fy = 250 MPa, ÿmo =1.1 and fu = 410 MPa	A	2	
	d)	Sketch the four end condition of column showing their effective length	U	3	
	e)	A rolled steel beam section HB 350 @ 0.674 kN/ m is used as a stanchion. If the unsupported length of the stanchion is 4 m, evaluate safe load carrying capacity of the section.	A	3	
	f)	Draw and labeled any four forms of built-up compression member.	U	3	

Q2C

FIGURE NO1.

Q 3c

FIGURE NO 2

214

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER/WINTER-

EXAM SEAT NO.

LEVEL : - IV   PROGRAM : Diploma in Civil Engineering

COURSE CODE :- CEG403/CEF 403

COURSE NAME :- Design and drafting of Steel Structures

MAX. MARKS : 80   TIME : 03 Hrs   DATE :-30/11/23

QN	SQN	SECTION –II	R/U/A	CEG 403	Marks
Q.4		Attempt any **FOUR**:			08
	a)	Draw the two common sections used as compound beam	R	4	
	b)	State the situations where plate girder is used.	R	4	
	c)	State the types of column bases with their suitability.	U	5	
	d)	Draw sketch of Gusseted base (Front View).	U	5	
	e)	State the type of roof truss suitable span i) 6m ii) 17m.	U	6	
	f)	State load combination and design approach for purlin.	R	6	
Q.5		Attempt any **TWO**:			16
	a)	An ISMB 350@ 514 N/m is used as simply supported beam for 5m span is laterally supported. Determine design flexural strength of beam. Also calculate working UDL the beam can carry per m span and also check member for deflection. Given Z_p = 889.6 X 10^3 mm³. E=210GPa, I_{xx}= 13630 mm $\square$, t_f = 14.2mm, t_w = 8.1mm, r_1 = 14mm, z_{xx} = 779X10^3 mm³.	A	4	
	b)	i) State the classification of sections of beam based on moment rotation behavior. ii) Draw sketches of laterally supported and laterally unsupported beam sections.	U U	4 4	
	c)	Calculate panel point load of dead load and live load for truss with span = 16m, rise = 3m, spacing of truss = 3.8m c/c, No. of panels = 8, wt. of covering = 120MPa, combined wt. of purlin and bracing = 150N.m².	A	6	
Q.6		Attempt any **TWO**:			16
	a)	i) Draw neat sketch showing components of plate girder. ii) State the advantages and disadvantages of tubular structure.	U U	4 6	
	b)	Design slab base for column ISHB 350 with b_t = 250mm and t_f= 11.6mm. to carry factored axial load of 1500kN. The base rest on concrete pedestal M20. Also design concrete pedestal if safe bearing capacity of soil is 300kN/m².	A	5	
	c)	A roof truss of span 16m & rise 3.5m with spacing between the trusses are 4m c/c having 14 No. of panels. Calculate live load and wind load per panel when wind is parallel to the ridge. Show loading diagram for each case. if Cpe = -0.7 for critical case & Cpi = +/- 0.2. Design wind pressure= 1200 N/m².	A	6	

************ 3/4

Table 2 Limiting Width to Thickness Ratio

(Clauses 3.7.2 and 3.7.4)

Contd

Compression Element			Ratio	Class 1 Plastic	Class 2 Compact	Class 3 Semi-compact
(1)			(2)	(3)	(4)	(5)
Outstanding element of compression flange	Rolled section		b/t_f	9.4ε	10.5ε	15.7ε
	Welded section		b/t_f	8.4ε	9.4ε	13.6ε
Internal element of compression flange	Compression due to bending		b/t_f	29.3ε	33.5ε	42ε
	Axial compression		b/t_f	Not applicable		
Web of an I, H or box section	Neutral axis at mid-depth		d/t_w	84ε	105ε	126ε
	Generally	If r_1 is negative:	d/t_w	$\dfrac{84\varepsilon}{1+r_1}$ but $\le 42\varepsilon$	$\dfrac{105.0\varepsilon}{1+r_1}$	$\dfrac{126.0\varepsilon}{1+2r_1}$ but $\le 42\varepsilon$
		If r_1 is positive:	d/t_w		$\dfrac{105.0\varepsilon}{1+1.5r_1}$ but $\le 42\varepsilon$	
	Axial compression		d/t_w	Not applicable		42ε
Web of a channel			d/t_w	42ε	42ε	42ε
Angle, compression due to bending (Both criteria should be satisfied)			b/t d/t	9.4ε 9.4ε	10.5ε 10.5ε	15.7ε 15.7ε
Single angle, or double angles with the components separated, axial compression (All three criteria should be satisfied)			b/t d/t $(b+d)/t$	Not applicable		15.7ε 15.7ε 25ε
Outstanding leg of an angle in contact back-to-back in a double angle member			d/t	9.4ε	10.5ε	15.7ε
Outstanding leg of an angle with its back in continuous contact with another component			d/t	9.4ε	10.5ε	15.7ε
Stem of a T-section, rolled or cut from a rolled I- or H-section			D/t_f	8.4ε	9.4ε	18.9ε
Circular hollow tube, including welded tube subjected to: a) moment			D/t	$42\varepsilon^2$	$52\varepsilon^2$	$146\varepsilon^2$
b) axial compression			D/t	Not applicable		$88\varepsilon^2$

NOTES

1 Elements which exceed semi-compact limits are to be taken as of slender cross-section.

2 $\varepsilon = (250/f_y)^{1/2}$.

3 Webs shall be checked for shear buckling in accordance with 8.4.2 when $d/t > 67\varepsilon$, where, b is the width of the element (may be taken as clear distance between lateral supports or between lateral support and free edge, as appropriate), t is the thickness of element, d is the depth of the web, D is the outer diameter of the element (*see* Fig. 2, 3.7.3 and 3.7.4).

4 Different elements of a cross-section can be in different classes. In such cases the section is classified based on the least favourable classification.

5 The stress ratio r_1 and r_2 are defined as:

$$r_1 = \frac{\text{Actual average axial stress (negative if tensile)}}{\text{Design compressive stress of web alone}}$$

$$r_2 = \frac{\text{Actual average axial stress (negative if tensile)}}{\text{Design compressive stress of overll section}}$$

$$V_{nsb} = \left(\frac{f_u}{\sqrt{3}}\right)(n_n A_{nb} + n_s A_{sb}) \ , \quad V_{dsb} = \frac{V_{nsb}}{\gamma_{mb}} \ , \qquad V_{dpb} = \frac{V_{npb}}{\gamma_{mb}}$$

$$T_{dg} = \frac{A_g f_y}{\gamma_{m0}} \ , \qquad\qquad V_{npb} = 2.5 k_b \, d \, t \, f_u \qquad k_b \text{ is smaller of } \frac{e}{3d_0} , \frac{p}{3d_0} - 0.25 ,$$

$$T_{dn} = \frac{0.9 A_{nc} f_u}{\gamma_{m1}} + \beta \frac{A_{go} f_y}{\gamma_{m0}} \quad \text{where} \quad \beta = 1.4 - 0.076 \,(w/t)\,(f_y/f_u)\,(b_s/L_c) \qquad \leq (f_u \gamma_{m0}/f_y \gamma_{m1}) \qquad \frac{f_{ub}}{f_u} , \& \, 1$$

$$\geq 0.7$$

$$T_{dn} = \frac{\alpha A_n f_u}{\gamma_{m1}} \quad , \qquad T_{db1} = \frac{A_{vg} f_y}{\sqrt{3}\gamma_{m0}} + \frac{0.9 A_{tn} f_u}{\gamma_{m1}} \quad , \qquad T_{db2} = \frac{0.9 A_{vn} f_u}{\sqrt{3}\gamma_{m1}} + \frac{A_{tg} f_y}{\gamma_{m0}}$$

$$P_d = A_e f_{cd} \ , \qquad P_z = 0.6 V_z^2 \quad , \qquad V_z = V_b \, k_1 \, k_2 \, k_3$$

$$f_{cd} = \chi \frac{f_y}{\gamma_{m0}} \ , \qquad \chi = \frac{1}{\phi + \sqrt{\phi^2 - \lambda_e^2}} \quad , \text{ where } \quad \phi = 0.5[1 + \alpha(\lambda_e - 0.2) + \lambda_e^2]$$

$$\lambda_e = \sqrt{k_1 + k_2 \lambda_w^2 + k_3 \lambda_\varphi^2}$$

$$\text{where} \qquad \lambda_w = \frac{\left(\dfrac{l}{r_w}\right)}{\varepsilon\sqrt{\dfrac{\pi^2 E}{250}}} \quad \text{and} \quad \lambda_\varphi = \frac{(b_1 + b_2)/2t}{\varepsilon\sqrt{\dfrac{\pi^2 E}{250}}} \qquad M_{dz} = \frac{\beta_b \times Z_p \times f_y}{\gamma_{mo}}$$

$$V_{dz} = \frac{f_y \times t_w \times h}{\gamma_{mo} \times \sqrt{3}}$$

$$t_s = \sqrt{[2.5w(a^2 - 0.3b^2)\gamma mo / fy]} \qquad > t_f$$

Values of χ and fcd (N/mm^2) for different values of KL/r_{min} as per buckling curve 'c'

KL/r_{min}	10	20	30	40	50	60	70	80	90
χ	1.000	0.987	0.930	0.870	0.807	0.740	0.670	0.600	0.533
fcd	227	224	211	198	183	168	152	136	121

KL/r_{min}	100	110	120	130	140	150	160	170	180
χ	0.471	0.416	0.368	0.327	0.291	0.261	0.234	0.212	0.192
fcd	107	94.6	83.7	74.3	66.2	59.2	53.3	48.1	43.6

Constants k_1, k_2, k_3 for design of single Angle strut

No. of bolts	Fixity	K1	K2	K3
≥ 2	Fixed/Weld	0.20	0.35	20
	Hinged	0.70	0.60	5
1	Fixed	0.75	0.35	20
	Hinged	1.25	0.50	60

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.
(An Autonomous Institute of Govt. Of Maharashtra)
SUMMER/WINTER-
EXAM SEAT NO.

LEVEL : - IV   PROGRAM : CIVIL ENGINEERING
COURSE CODE :- CEG-403 /CEF 403
COURSE NAME :- DESIGN AND DRAFTING OF STEEL STRUCTURE
MAX. MARKS : 80   TIME : 03 Hrs   DATE :- 30/11/23

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

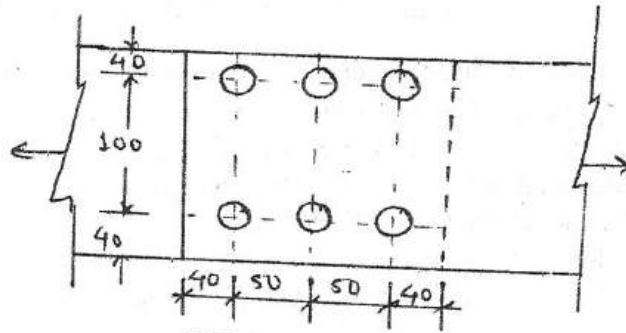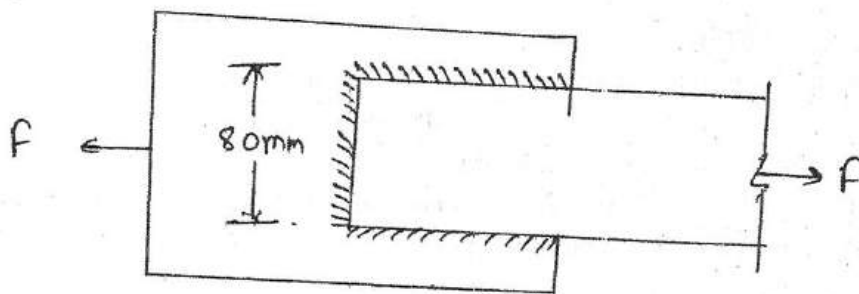| QN	SQN	SECTION -I	R/U/A	Co CEG-403	Marks
Q.1		Attempt any **FOUR:**			08
	a)	Distinguish between gauge distance and pitch of the bolt.	U	2	
	b)	State full form of i) ISJC II) ISLB of rolled steel section.	R	1	
	c)	Enlist any four types of steel structure.	U	1	
	d)	Draw any two typical cross sections of tension member using angle sections	U	3	
	e)	State the various types of tension members.	R	3	
	f)	Define the slenderness ratio (λ)	R	3	
Q.2		Attempt any **FOUR:**			16
	a)	State physical and mechanical properties of structural steel.	R	1	
	b)	Design a lap joint between the two plates each of width 120mm, if the thickness of one plate is 16mm and the other is 12mm. the joint has to transfer a design load of 160KN. Use i) grade of plate- Fe410, ii) grade of bolt- 4.6, iii) diameter of bolt-16mm, iv) edge distance- 30mm, v) pitch distance- 40mm	A	2	
	c)	Two flat plates 180mm x 10mm are connected in a lap joint using 6 bolts of 20mm diameter as shown in fig no1. Determine the strength of plate in tension. Take f_y=250 N/mm^2 and f_u = 410N/mm^2	A	3	
	d)	State the functions of lacing and battening. Draw neat sketches of single lacing and battening.	R	3	
	e)	A strut 2ISA 100x100x6mm, 2.8 m long connected to 10mm thick gusset plate on either side by two bolts at each end. Determine compressive load carrying capacity of angle strut. For ISA 100x100x6 mm - A – 1167mm^2, $I_{xx} = I_{yy}$=111.3x10^4 mm^2, $C_{xx} = C_{yy}$=26.76mm	A	3	
	f)	Explain with neat sketch stress-strain curve with its salient features.	A	1	
Q.3		Attempt any **FOUR:**			16
	a)	State any four types of load to which structure are subjected along with respective relevant codes.	R	1	
	b)	Draw a neat sketch of a) v- butt welded joint b) lap bolted joint	U	2	
	c)	Design a suitable fillet weld to connect a tie bar 80 mm × 8 mm to 10 mm thick gusset plate. Design the joint for full strength of the tie and assume welding on all three sides as shown in figure no. 2 Take fy = 250 MPa, ÿmo = 1.1 and fu = 410 MPa	A	2	
	d)	Sketch the four end condition of column showing their effective length	U	3	
	e)	A rolled steel beam section HB 350 @ 0.674 kN/ m is used as a stanchion. If the unsupported length of the stanchion is 4 m, evaluate safe load carrying capacity of the section.	A	3	
	f)	Draw and labeled any four forms of built-up compression member.	U	3	

Q2C

FIGURE NO 1.

Q3c

80mm

f ←   → f

FIGURE NO 2

2|4

LEVEL : - IV   PROGRAM : Diploma in Civil Engineering

COURSE CODE :- CEG403/CEF403

COURSE NAME :- Design and drafting of Steel Structures

MAX. MARKS : **80**   TIME : **03 Hrs**   DATE :-30/11/23

QN	SQN	SECTION –II	R/U/A	CEG 403	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Draw the two common sections used as compound beam	R	4	
	b)	State the situations where plate girder is used.	R	4	
	c)	State the types of column bases with their suitability.	U	5	
	d)	Draw sketch of Gusseted base (Front View).	U	5	
	e)	State the type of roof truss suitable span i) 6m ii) 17m.	U	6	
	f)	State load combination and design approach for purlin.	R	6	
Q.5		Attempt any **TWO:**			**16**
	a)	An ISMB 350@ 514 N/m is used as simply supported beam for 5m span is laterally supported. Determine design flexural strength of beam. Also calculate working UDL the beam can carry per m span and also check member for deflection. Given $Z_p = 889.6 \times 10^3$ mm³. E=210GPa, $I_{xx}= 13630$ mm □, $t_f = 14.2$mm, $t_w = 8.1$mm, $r_1 = 14$mm, $z_{xx} = 779 \times 10^3$ mm³.	A	4	
	b)	i) State the classification of sections of beam based on moment rotation behavior. ii) Draw sketches of laterally supported and laterally unsupported beam sections.	U U	4 4	
	c)	Calculate panel point load of dead load and live load for truss with span = 16m, rise = 3m, spacing of truss = 3.8m c/c, No. of panels = 8, wt. of covering = 120MPa, combined wt. of purlin and bracing = 150N.m².	A	6	
Q.6		Attempt any **TWO:**			**16**
	a)	i) Draw neat sketch showing components of plate girder. ii) State the advantages and disadvantages of tubular structure.	U U	4 6	
	b)	Design slab base for column ISHB 350 with $b_t = 250$mm and $t_f = 11.6$mm. to carry factored axial load of 1500kN. The base rest on concrete pedestal M20. Also design concrete pedestal if safe bearing capacity of soil is 300kN/m².	A	5	
	c)	A roof truss of span 16m & rise 3.5m with spacing between the trusses are 4m c/c having 14 No. of panels. Calculate live load and wind load per panel when wind is parallel to the ridge. Show loading diagram for each case. if Cpe = -0.7 for critical case & Cpi = +/- 0.2. Design wind pressure= 1200 N/m².	A	6	

************ 3/4

Table 2 Limiting Width to Thickness Ratio

(Clauses 3.7.2 and 3.7.4)

Contd

Compression Element			Ratio	Class of Section		
				Class 1 Plastic	Class 2 Compact	Class 3 Semi-compact
(1)			(2)	(3)	(4)	(5)
Outstanding element of compression flange		Rolled section	b/t_f	9.4ε	10.5ε	15.7ε
		Welded section	b/t_f	8.4ε	9.4ε	13.6ε
Internal element of compression flange		Compression due to bending	b/t_f	29.3ε	33.5ε	42ε
		Axial compression	b/t_f	Not applicable		
Web of an I, H or box section		Neutral axis at mid-depth	d/t_w	84ε	105ε	126ε
	Generally	If r_1 is negative:	d/t_w	84ε but $\leq 42\varepsilon$	$\dfrac{105.0\varepsilon}{1+r_1}$	126.0ε
		If r_1 is positive :	d/t_w	$\dfrac{1+r_1}{}$ but $\leq 42\varepsilon$	$\dfrac{105.0\varepsilon}{1+1.5r_1}$ but $\leq 42\varepsilon$	$\dfrac{1+2r_1}{}$ but $\leq 42\varepsilon$
	Axial compression		d/t_w	Not applicable		42ε
Web of a channel			d/t_w	42ε	42ε	42ε
Angle, compression due to bending (Both criteria should be satisfied)			b/t d/t	9.4ε 9.4ε	10.5ε 10.5ε	15.7ε 15.7ε
Single angle, or double angles with the components separated, axial compression (All three criteria should be satisfied)			b/t d/t $(b+d)/t$	Not applicable		15.7ε 15.7ε 25ε
Outstanding leg of an angle in contact back-to-back in a double angle member			d/t	9.4ε	10.5ε	15.7ε
Outstanding leg of an angle with its back in continuous contact with another component			d/t	9.4ε	10.5ε	15.7ε
Stem of a T-section, rolled or cut from a rolled I- or H-section			D/t_f	8.4ε	9.4ε	18.9ε
Circular hollow tube, including welded tube subjected to: a) moment			D/t	$42\varepsilon^2$	$52\varepsilon^2$	$146\varepsilon^2$
b) axial compression			D/t	Not applicable		$88\varepsilon^2$

NOTES

1 Elements which exceed semi-compact limits are to be taken as of slender cross-section.

2 $\varepsilon = (250/f_y)^{1/2}$.

3 Webs shall be checked for shear buckling in accordance with 8.4.2 when $d/t > 67\varepsilon$, where, b is the width of the element (may be taken as clear distance between lateral supports or between lateral support and free edge, as appropriate), t is the thickness of element, d is the depth of the web, D is the outer diameter of the element (see Fig. 2, 3.7.3 and 3.7.4).

4 Different elements of a cross-section can be in different classes. In such cases the section is classified based on the least favourable classification.

5 The stress ratio r_1 and r_2 are defined as:

$$r_1 = \frac{\text{Actual average axial stress (negative if tensile)}}{\text{Design compressive stress of web alone}}$$

$$r_2 = \frac{\text{Actual average axial stress (negative if tensile)}}{\text{Design compressive stress of overll section}}$$

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$$V_{nsb} = \left(\frac{f_u}{\sqrt{3}}\right)(n_n A_{nb} + n_s A_{sb}) \ , \quad V_{dsb} = \frac{V_{nsb}}{\gamma_{mb}} \ , \quad V_{dpb} = \frac{V_{npb}}{\gamma_{mb}}$$

$$T_{dg} = \frac{A_g f_y}{\gamma_{m0}} \ ,$$

$$V_{npb} = 2.5 k_b \, d \, t \, f_u \qquad \underline{k_b \text{ is smaller of } \frac{e}{3d_0} , \frac{p}{3d_0} - c \, 2.}$$

$$T_{dn} = \frac{0.9 A_{nc} f_u}{\gamma_{m1}} + \beta \frac{A_{go} f_y}{\gamma_{m0}} \quad \text{where} \quad \beta = 1.4 - 0.076 \, (w/t) \, (f_y/f_u) \, (b_s/L_c) \qquad \frac{f_{ub}}{f_u} \, \cdot \, 8 \, 1$$

$$\le (f_u \gamma_{m0} / f_y \gamma_{m1})$$

$$\ge 0.7$$

$$T_{dn} = \frac{\alpha A_n f_u}{\gamma_{m1}} \ , \qquad T_{db1} = \frac{A_{vg} f_y}{\sqrt{3} \gamma_{m0}} + \frac{0.9 A_{tn} f_u}{\gamma_{m1}} \ , \qquad T_{db2} = \frac{0.9 A_{vn} f_u}{\sqrt{3} \gamma_{m1}} + \frac{A_{tg} f_y}{\gamma_{m0}}$$

$$P_d = A_e f_{cd} \ , \qquad P_z = 0.6 \, V_z^2 \ , \qquad V_z = V_b \, k_1 \, k_2 \, k_3$$

$$f_{cd} = \chi \frac{f_y}{\gamma_{m0}} \ , \qquad \chi = \frac{1}{\phi + \sqrt{\phi^2 - \lambda_e^2}} \ , \quad \text{where} \quad \phi = 0.5[1 + \alpha(\lambda_e - 0.2) + \lambda_e^2]$$

$$\lambda_e = \sqrt{k_1 + k_2 \lambda_w^2 + k_3 \lambda_\phi^2}$$

$$\text{where} \qquad \lambda_w = \frac{\left(\frac{l}{r_w}\right)}{\varepsilon \sqrt{\frac{\pi^2 E}{250}}} \quad \text{and} \quad \lambda_\phi = \frac{(b_1 + b_2)/2t}{\varepsilon \sqrt{\frac{\pi^2 E}{250}}} \qquad M_{dz} = \frac{\beta_b \times Z_p \times f_y}{\gamma_{mo}}$$

$$V_{dz} = \frac{f_y \times t_w \times h}{\gamma_{mo} \times \sqrt{3}}$$

$$t_s = \sqrt{[2.5w(a^2 - 0.3b^2)\gamma_{mo} / f_y]} \qquad > t_f$$

Values of χ and f_{cd} (N/mm^2) for different values of KL/r_{min} as per buckling curve 'c'

KL/r_{min}	10	20	30	40	50	60	70	80	90
χ	1.000	0.987	0.930	0.870	0.807	0.740	0.670	0.600	0.533
f_{cd}	227	224	211	198	183	168	152	136	121

KL/r_{min}	100	110	120	130	140	150	160	170	180
χ	0.471	0.416	0.368	0.327	0.291	0.261	0.234	0.212	0.192
f_{cd}	107	94.6	83.7	74.3	66.2	59.2	53.8	48.1	43.6

Constants k_1, k_2, k_3 for design of single Angle strut.

No. of bolts	Fixing	K1	K2	K3
≥ 2	Fixed/Weld	0.20	0.35	20
	Hinged	0.70	0.60	5
1	Fixed	0.75	0.35	20
	Hinged	1.25	0.50	60

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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ODD TERM END EXAM WINTER -2023

EXAM SEAT NO.

LEVEL :- FOURTH   PROGRAM : CIVIL ENGINEERING
COURSE CODE :- CEG405/CEF406
COURSE NAME   CONCRETE TECHNOLOGY
MAX. MARKS : 80   TIME : 03 Hrs   DATE :- 30/ 11 / 2023

Instruction :-
1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	SQN	SECTION -I	R/U/A	Co CEG 405	Marks
Q.1		Attempt any **FOUR**:			08
	a)	Define initial and Final setting time of Cement.	R	2	
	b)	Define Flakiness index.	R	2	
	c)	State types of Finishing of concrete.	U	1	
	d)	Define Admixtures and its function.	R	1	
	e)	Define Segregation and Bleeding of concrete.	R	3	
	f)	State any two methods of measuring workability.	U	3	
Q.2		Attempt any **FOUR**:			16
	a)	Define concrete and explain Ingredients of concrete in brief.	R	1	
	b)	Enlist any four Admixtures and explain any one.	U	1	
	c)	Explain Laboratory procedure to determine Silt content of sand.	U	2	
	d)	Explain Laboratory procedure to determine impact value of aggregates.	U	2	
	e)	Explain heat of hydration in case of cement.	I	2	
	f)	Explain any four factors affecting on workability.	U	3	
Q.3		Attempt any **FOUR**:			16
	a)	Explain any one method of compaction of concrete.	U	1	
	b)	Enlist concrete Mixer. Explain any one.	U	1	
	c)	State four purposes of finishing of concrete and enlist any two types of finishing.	U	1	
	d)	Explain Laboratory procedure to determine standard consistency of cement.	U	2	
	e)	Calculate Finess modulus and classify the sand from this weight of sample = 500gm.	A	2	
	f)	Write step by step procedure for determination of compaction factor of concrete in the laboratory.	R	3	

Sieve size	2.36 mm	1.18 mm	600 micron	300 micron	150 micron	75 micron
Weight in gm	10	105	137	175	63	10

P.T.O.

QN	SQN	SECTION II	RUA	CO CEG 405	Marks
Q.4		Attempt any **FOUR**			**(08)**
	a)	Enlist four methods of concrete mix design.	R	4	
	b)	Define mix design	R	4	
	c)	Show water cement ration law.	R	5	
	d)	Define characteristic strength of concrete.	R	5	
	e)	Define hot weather concreting.	R	6	
	f)	State any two precaution for cold weather concreting.	R	6	
Q.5		Attempt any **FOUR**			**(16)**
	a)	Explain in detail IS code method of concrete mix design	U	4	
	b)	Compare steel formwork & timber formwork.	U	4	
	c)	Explain testing of concrete by rebound hammer method.	U	5	
	d)	State the factors which affect the water cement ratio.	U	5	
	e)	Enlist the application of short creating .	U	6	
	f)	State properties of fibre reinforced concrete and places where it is used.	U	6	
Q.6		Attempt any **FOUR**			**(16)**
	a)	State requirements of good formwork.	U	4	
	b)	Define characteristic strength of concrete. State grades of concrete.	U	5	
	c)	Explain the durability of concrete and factors affecting it.	U	5	
	d)	Explain ready mix concrete and it's applications.	U	6	
	e)	Explain the procedure of 'Tremie method' of concreting under water.	U	6	
	f)	State the application of i) Polymer Concrete ii) Ferro- cement.	U	6	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)
ODD TERM END EXAM WINTER -2023
EXAM SEAT NO.

LEVEL :- FOURTH   PROGRAM : CIVIL ENGINEERING
COURSE CODE :- CEG405/CEF406
COURSE NAME   CONCRETE TECHNOLOGY
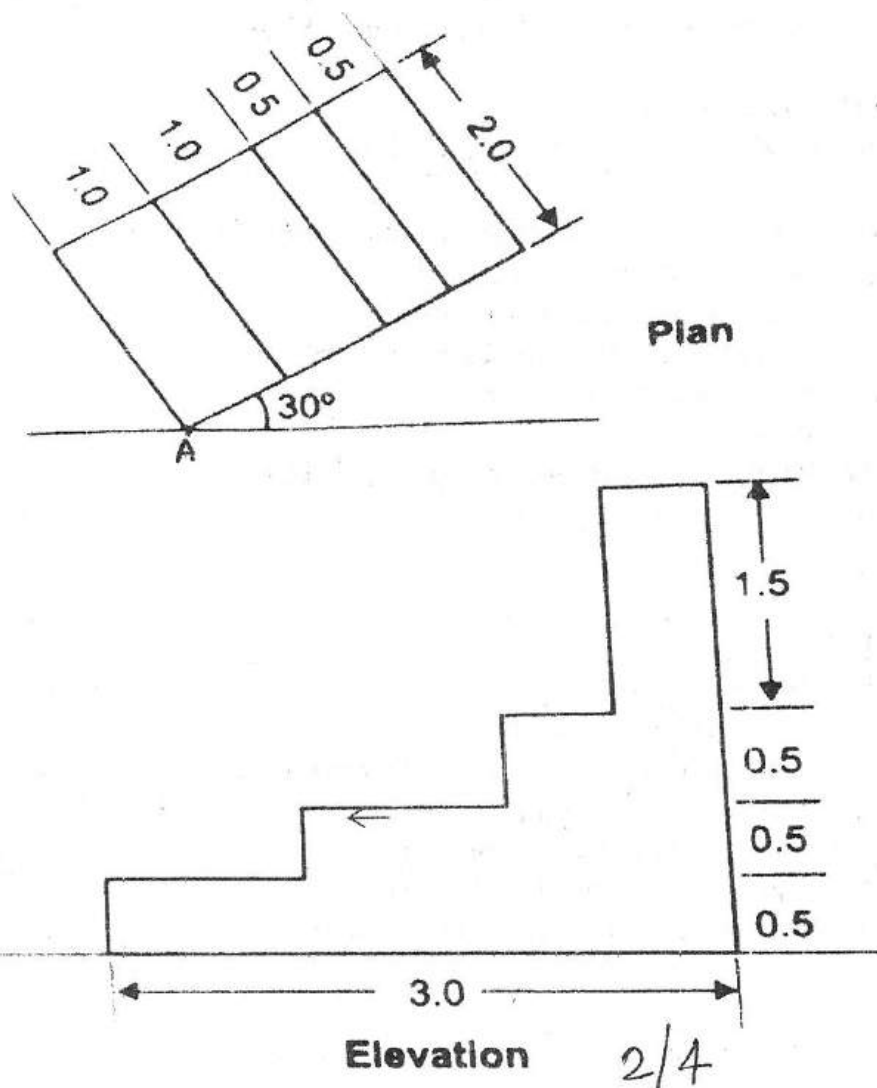MAX. MARKS : 80   TIME : 03 Hrs   DATE :- 30/ 11 / 2023

Instruction :-
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QN	SQN	SECTION -I	R/U/A	Co CEG 405	Marks
Q.1		Attempt any **FOUR**:			08
	a)	Define initial and Final setting time of Cement.	R	2	
	b)	Define Flakiness index.	R	2	
	c)	State types of Finishing of concrete.	U	1	
	d)	Define Admixtures and its function.	R	1	
	e)	Define Segregation and Bleeding of concrete.	R	3	
	f)	State any two methods of measuring workability.	U	3	
Q.2		Attempt any **FOUR**:			16
	a)	Define concrete and explain Ingredients of concrete in brief.	R	1	
	b)	Enlist any four Admixtures and explain any one.	U	1	
	c)	Explain Laboratory procedure to determine Silt content of sand.	U	2	
	d)	Explain Laboratory procedure to determine impact value of aggregates.	U	2	
	e)	Explain heat of hydration in case of cement.	I	2	
	f)	Explain any four factors affecting on workability.	U	3	
Q.3		Attempt any **FOUR**:			16
	a)	Explain any one method of compaction of concrete.	U	1	
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	d)	Explain Laboratory procedure to determine standard consistency of cement.	U	2	
	e)	Calculate Finess modulus and classify the sand from this weight of sample = 500gm.	A	2	
	f)	Write step by step procedure for determination of compaction factor of concrete in the laboratory.	R	3	

For Q.3 e):

Sieve size	2.36 mm	1.18 mm	600 micron	300 micron	150 micron	75 micron
Weight in gm	10	105	137	175	63	10

P.T.O.

QN	SQN	SECTION II	RUA	CO CEG 405	Marks
Q.4		Attempt any **FOUR**			(08)
	a)	Enlist four methods of concrete mix design.	R	4	
	b)	Define mix design	R	4	
	c)	Show water cement ration law.	R	5	
	d)	Define characteristic strength of concrete.	R	5	
	e)	Define hot weather concreting.	R	6	
	f)	State any two precaution for cold weather concreting.	R	6	
Q.5		Attempt any **FOUR**			(16)
	a)	Explain in detail IS code method of concrete mix design	U	4	
	b)	Compare steel formwork & timber formwork.	U	4	
	c)	Explain testing of concrete by rebound hammer method.	U	5	
	d)	State the factors which affect the water cement ratio.	U	5	
	e)	Enlist the application of short creating .	U	6	
	f)	State properties of fibre reinforced concrete and places where it is used.	U	6	
Q.6		Attempt any **FOUR**			(16)
	a)	State requirements of good formwork.	U	4	
	b)	Define characteristic strength of concrete. State grades of concrete.	U	5	
	c)	Explain the durability of concrete and factors affecting it.	U	5	
	d)	Explain ready mix concrete and it's applications.	U	6	
	e)	Explain the procedure of 'Tremie method' of concreting under water.	U	6	
	f)	State the application of i) Polymer Concrete ii) Ferro- cement.	U	6	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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WINTER/SUMMER- 2023

EXAM SEAT NO.

LEVEL :- 3   PROGRAM : CIVIL ENGINEERING

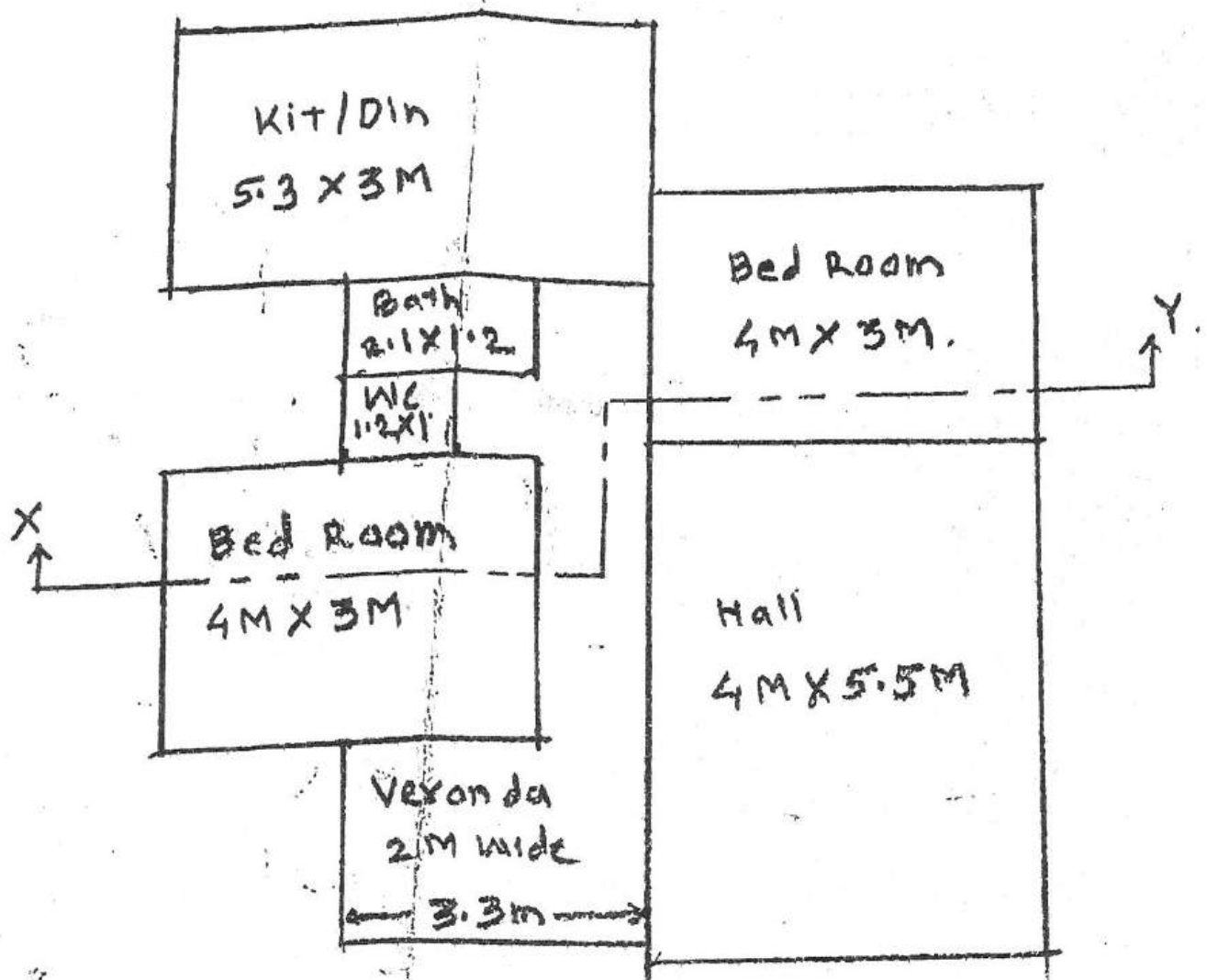COURSE CODE :- CEG303

COURSE NAME :- BUILDING DRAWING

MAX. MARKS : 80   TIME : 04 Hrs   DATE :- 01/12/23

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	SQN		R/U/A	Co CEG 303	Marks
Q.1		Attempt any **FOUR**:			**08**
	a)	Enlist various plan sanctioning authorities	R	2	02
	b)	State any two objectives of Building Bye-laws.	R	2	02
	c)	Define- Station point and Vanishing Points w.r.t. to Perspective drawing	R	5	02
	d)	State minimum dimensions to be provided for - i) Height of Mezzanine Floor ii) Height of store room	U	3	02
	e)	State the scales to be adopted for – Developed plan and Site Plan	U	3	02
	f)	Draw the symbols for Earth work and Revolving door as per I.S. 962; 1989	R	1	02
Q.2		Attempt any **FOUR**:			**16**
	a)	Describe the principles of planning Aspect and Orientation of building with its importance	U	3	04
	b)	Define – i) Floor Area ii) Plinth Area iii) Plot Area iv) Carpet Area	R	2	04
	c)	Enlist various documents required for plan sanctioning and state its number of copies required.	U	2	04
	d)	State the minimum area to be provided for various units of a residential building i) Living room ii) W.C. iii) Kitchen iv) Combined W.C. and Bath	U	3	04
	e)	Describe the types of perspective based on position of object w.r.t. picture plane and number of vanishing points	U	5	04
	f)	State different types of scales used in drawing. State the criteria for the selection of scale for specific drawing	U	1	04
Q.3		Attempt any TWO:			**16**
	a)	Figure 'A' shows a plan ad elevation of Thresholds, one side of which is inclined at 30° to the picture plane and touches the same at A. The observer is standing at a distance of 2 m along the central visual ray. Assume eye level as 1.50 m above G.L. Draw two point perspective drawing to a suitable scale. Retain all construction lines	A	5	08
	b)	Draw a line plan of a Primary Health Centre at a town place. Show the position of openings , along with all the units with their appropriate sizes	A	4	08
	c)	i. List the various principles of planning to be adopted for the building. ii State the purposes and preliminary requirements of drawing	R / U	3 / 1	04 / 04

1/4

P.T.O.

QUE. NO. 3- FIG. "A" ↓

Plan

1.0 1.0 0.5 0.5 0.5

2.0

30°

A

1.5

0.5

0.5

0.5

3.0

Elevation 2/4

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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WINTER/SUMMER- 2023

EXAM SEAT NO.

LEVEL : - III   PROGRAM : Civil Engineering

COURSE CODE :- CEG 303

COURSE NAME :- Building Drawing

MAX. MARKS : 80   TIME : **04 Hrs**   DATE :- 01/12-23
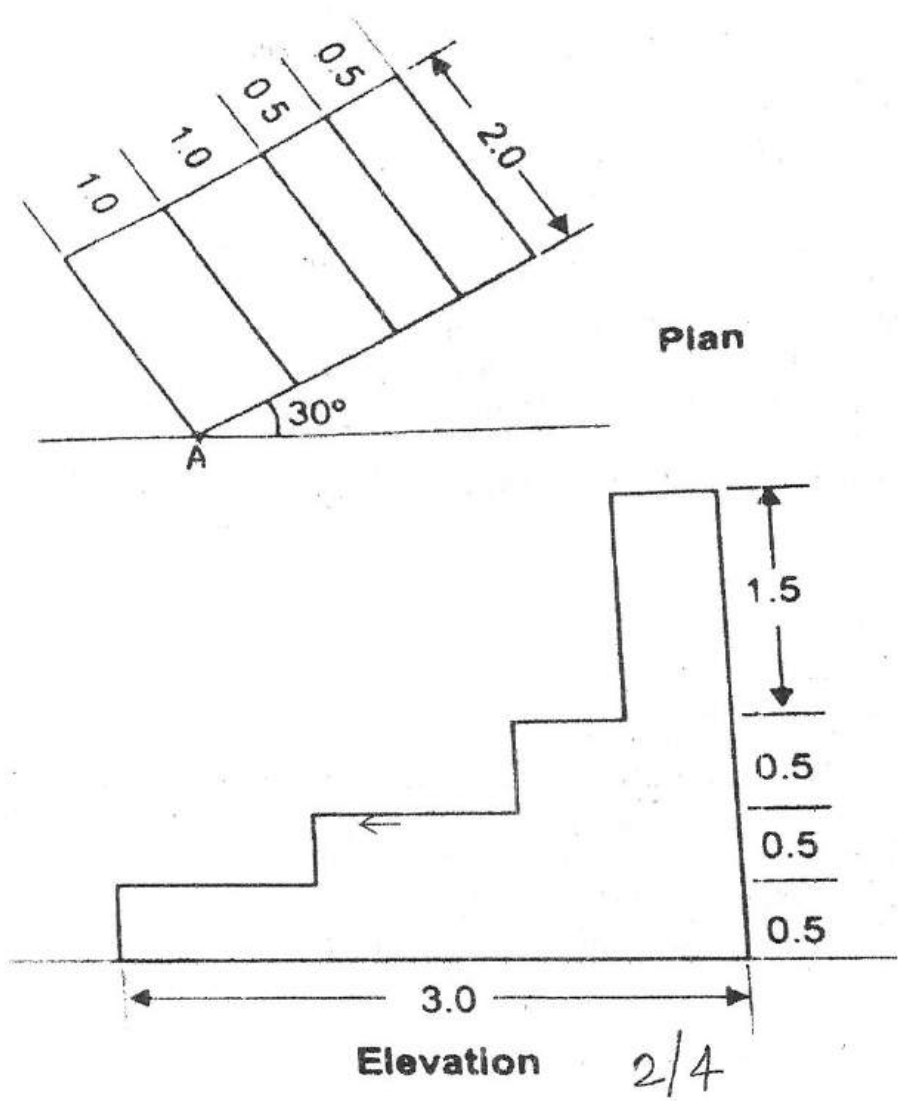
QN	SQN		R/U/A	Co CEG 303	Marks
Q.4		Attempt the following:			**40**
		Figure '2' shows line plan of a small Residential building. Draw to a scale of 1:50 (or any other suitable scale) the following views. (i) Detailed Plan 10 marks (ii) Front Elevation 08 marks (iii) The sectional elevation along section X-Y 15 marks (iv) Schedule of doors and windows 06 marks (v) North direction line 01 marks Using following Data: a) Structure is load bearing structure. b) Good hard foundation is available at 0.9 M below ground level c) P.C.C. bed below foundation (1:2:4) 15 cm thick and 1.2 M wide. d) Steeped wall footing in U.C.R. masonry in C.M.1:5 of 0.9 M wide. e) Plinth height 0.60 M above ground level with U.C.R. masonry in C.M. 1:5 of 60 cm thick. f) The super structure consists of C.R. masonry in C.M. (1:5), 40 cm thick with cement pointing on external faces and cement plaster on internal faces. g) Wall between WC and bath consists of B.B. masonry 15 cm thick partion wall in C.M. (1:5) h) R.C.C. slab (1:1.5:3), 15 cm thick and 3.0 m clear height above floor with slab projection 15 cm. i) Assume suitable position, size and type of doors and windows. j) Assume suitable additional data if required.	A	6	

****

3/4

Kit/Din
5.3 X 3M

Bath
2.1 X 1.2

WC
1.2 X 1

Bed Room
4M X 3M.

Bed Room
4M X 3M

X

Y

Hall
4M X 5.5M

Veronda
2M wide

3.3m

LINE PLAN
FIG '2' (Q.4)

Not to scale

4/4

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER- 2023

EXAM SEAT NO.

LEVEL :- 3   PROGRAM : CIVIL ENGINEERING

COURSE CODE :- CEG303

COURSE NAME :- BUILDING DRAWING

MAX. MARKS : 80   TIME : 04 Hrs   DATE :- 01/12/ 23

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	SQN		R/U/A	Co CEG 303	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Enlist various plan sanctioning authorities	R	2	02
	b)	State any two objectives of Building Bye-laws.	R	2	02
	c)	Define- Station point and Vanishing Points w.r.t. to Perspective drawing	R	5	02
	d)	State minimum dimensions to be provided for - i) Height of Mezzanine Floor ii) Height of store room	U	3	02
	e)	State the scales to be adopted for – Developed plan and Site Plan	U	3	02
	f)	Draw the symbols for Earth work and Revolving door as per I.S, 962; 1989	R	1	02
Q.2		Attempt any **FOUR:**			**16**
	a)	Describe the principles of planning Aspect and Orientation of building with its importance	U	3	04
	b)	Define – i) Floor Area ii) Plinth Area iii) Plot Area iv) Carpet Area	R	2	04
	c)	Enlist various documents required for plan sanctioning and state its number of copies required.	U	2	04
	d)	State the minimum area to be provided for various units of a residential building i) Living room ii) W.C. iii) Kitchen iv) Combined W.C. and Bath	U	3	04
	e)	Describe the types of perspective based on position of object w.r.t. picture plane and number of vanishing points	U	5	04
	f)	State different types of scales used in drawing. State the criteria for the selection of scale for specific drawing	U	1	04
Q.3		Attempt any TWO:			**16**
	a)	Figure 'A' shows a plan ad elevation of Thresholds, one side of which is inclined at 30° to the picture plane and touches the same at A. The observer is standing at a distance of 2 m along the central visual ray. Assume eye level as 1.50 m above G.L. Draw two point perspective drawing to a suitable scale. Retain all construction lines	A	5	08
	b)	Draw a line plan of a Primary Health Centre at a town place. Show the position of openings , along with all the units with their appropriate sizes	A	4	08
	c)	i. List the various principles of planning to be adopted for the building.	R	3	04
		ii State the purposes and preliminary requirements of drawing	U	1	04

P.T.O.

QUE. NO. 3- FIG. "A" ↓

Plan

30°

A

1.5

0.5

0.5

0.5

3.0

Elevation   2/4
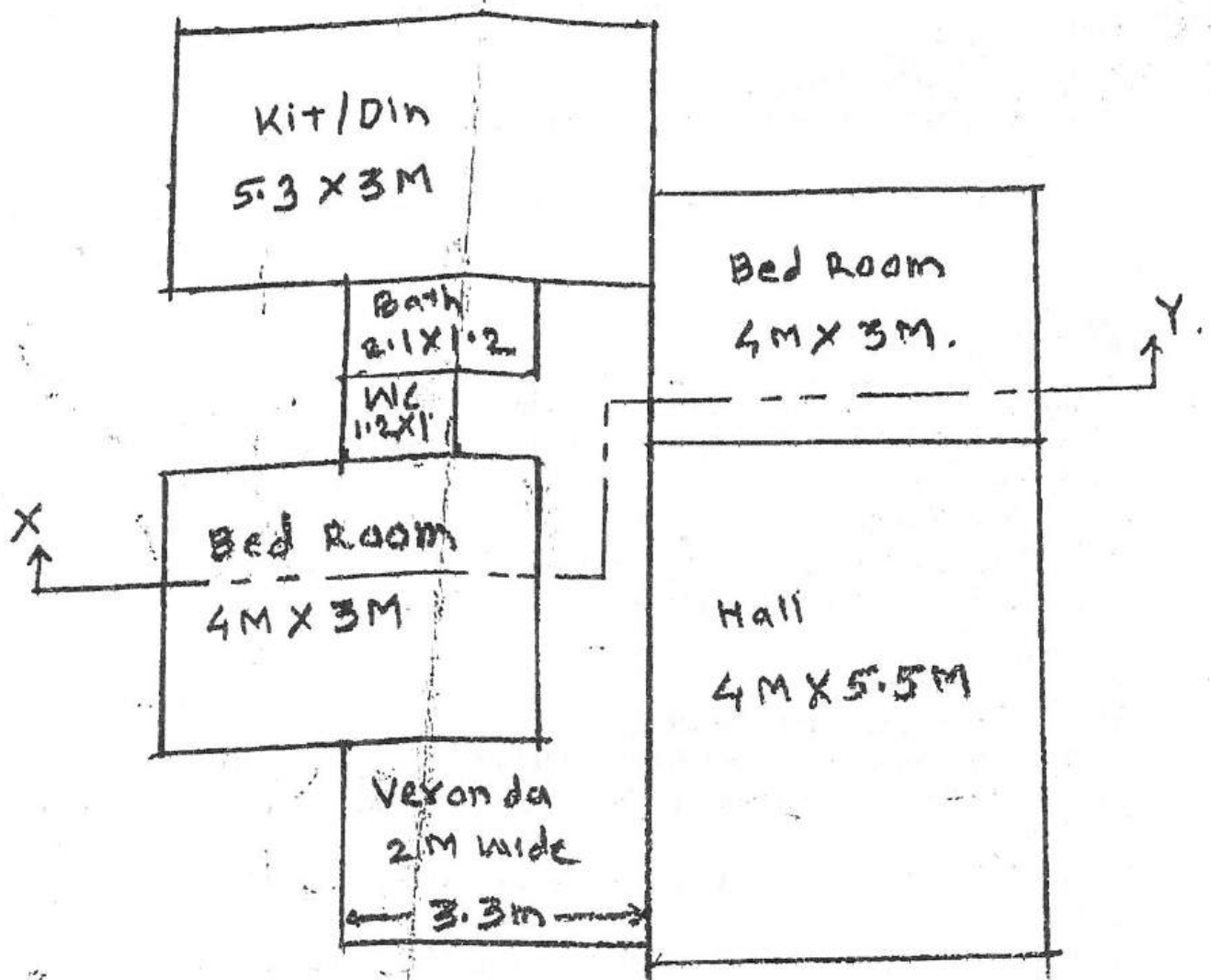
LEVEL : - III   PROGRAM : Civil Engineering

COURSE CODE :- CEG 303

COURSE NAME :- Building Drawing

MAX. MARKS : 80   TIME : 04 Hrs   DATE :- 01/ 12-23

QN	SQN		R/U/A	Co CEG 303	Marks
Q.4		Attempt the following:			40
		Figure '2' shows line plan of a small Residential building. Draw to a scale of 1:50 (or any other suitable scale) the following views.	A	6	
		(i) Detailed Plan 10 marks			
		(ii) Front Elevation 08 marks			
		(iii) The sectional elevation along section X-Y 15 marks			
		(iv) Schedule of doors and windows 06 marks			
		(v) North direction line 01 marks			
		Using following Data:			
		a) Structure is load bearing structure.			
		b) Good hard foundation is available at 0.9 M below ground level			
		c) P.C.C. bed below foundation (1:2:4) 15 cm thick and 1.2 M wide.			
		d) Steeped wall footing in U.C.R. masonry in C.M.1:5 of 0.9 M wide.			
		e) Plinth height 0.60 M above ground level with U.C.R. masonry in C.M. 1:5 of 60 cm thick.			
		f) The super structure consists of C.R. masonry in C.M. (1:5), 40 cm thick with cement pointing on external faces and cement plaster on internal faces.			
		g) Wall between WC and bath consists of B.B. masonry 15 cm thick partion wall in C.M. (1:5)			
		h) R.C.C. slab (1:1.5:3), 15 cm thick and 3.0 m clear height above floor with slab projection 15 cm.			
		i) Assume suitable position, size and type of doors and windows.			
		j) Assume suitable additional data if required.			

Kit/Din
5·3 × 3M

Bath
2·1 × 1·2

WC
1·2 × 1

Bed Room
4M × 3M

Bed Room
4M × 3M.

X

Y.

Hall
4M × 5.5M

Veronda
2 M wide

3·3m

LINE PLAN

FIG '2' (Q.4)

Not to scale

4/4

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER

EXAM SEAT NO.

LEVEL :- IV   PROGRAM : CIVIL ENGINEERING

COURSE CODE :- CEG 409

COURSE NAME :- Town and Country Planning

MAX. MARKS : 80   TIME : 03 Hrs   DATE :- 02/12/23

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	SQN	SECTION -I	R/U/A	Co CEG409	Marks
Q.1		Attempt any **FOUR:**			08
	a)	Define the term town and country planning.	R	CEG 409-1	
	b)	Enlist any four forms of town and country planning.	U	CEG 409-1	
	c)	Define Master Plan.	R	CEG 409-2	
	d)	Define Slum.	R	CEG 409-2	
	e)	Enlist any four agencies for housing schemes.	R	CEG 409-3	
	f)	Define neighbor-hood planning.	U	CEG 409-3	
Q.2		Attempt any **FOUR:**			16
	a)	Explain the objects of town planning.	U	CEG 409-1	
	b)	Explain growth of town in form of ribbon.	U	CEG 409-1	
	c)	Explain salient features of landscape architecture.	R	CEG 409-1	
	d)	Explain any four causes of slum.	U	CEG 409-2	
	e)	Enlist any eight data to be collected for the preparation of master plan.	A	CEG 409-2	
	f)	Explain the importance of neighbor-hood planning.	A	CEG 409-3	
Q.3		Attempt any **FOUR:**			16
	a)	Enlist any eight data types to be collected in town survey.	A	CEG 409-1	
	b)	State various types of surveys. Explain national survey.	R	CEG 409-1	
	c)	Explain various forms of recreation amenities.	U	CEG 409-2	
	d)	Explain any four factors to be considered for selecting site for industries.	U	CEG 409-2	
	e)	Explain the precautions to be taken against formation of slum.	A	CEG 409-2	
	f)	Explain classification of Housing.	R	CEG 409-3	

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER

EXAM SEAT NO.

LEVEL : - IV   PROGRAM : CIVIL ENGINEERING

COURSE CODE :- CEG 409

COURSE NAME :- TOWN & COUNTRY PLANNING

MAX. MARKS : **80**   TIME : **03 Hrs**   DATE :- 02/12/22

QN	SQN	SECTION –II	R/U/A	Co	Marks
Q.4		Attempt any **FOUR:**			08
	a)	Enlist local authorities for a sanctioning submission drawing	R	CEG 409-4	
	b)	State any two aims of land acquisition act	R	CEG 409-4	
	c)	Enlist the circumstances in which building bye laws are applicable	R	CEG 409-5	
	d)	Define floor space index	R	CEG 409-5	
	e)	State the different types of villages	R	CEG 409-6	
	f)	Define single nucleated settlement type of village with one example	R	CEG 409-6	
Q.5		Attempt any **FOUR:**			16
	a)	State the categories of MR and TP act	R	CEG 409-4	
	b)	Describe necessity of planning law and legislation	A	CEG 409-4	
	c)	State the provisions made in bye laws regarding fire protections	R	CEG 409-5	
	d)	Discuss the importance of bye laws	U	CEG 409-5	
	e)	Write any four general principles of rural housing design	U	CEG 409-6	
	f)	Explain the concept of low cost housing	U	CEG 409-6	
Q.6		Attempt any **FOUR:**			16
	a)	State any four functions of village panchayat	R	CEG 409-4	
	b)	Explain the framework of Panchayat Samiti	U	CEG 409-4	
	c)	Explain the term setback with net sketch	U	CEG 409-5	
	d)	Explain the term floating FSI with example.	U	CEG 409-5	
	e)	Explain any four Agro Industries in India	U	CEG 409-6	
	f)	Differentiate between rural and urban areas	U	CEG 409-6	

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LEVEL : - IV   PROGRAM : Civil Engineering
COURSE CODE :- CEG 404 / CEF404
COURSE NAME :- Estimating and Costing
MAX. MARKS : 80   TIME : 04 Hrs   DATE :- 02/12/ 23

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	SQN	SECTION -I	R/U/A	Co CEG404	Marks
Q.1		Attempt any **FOUR:**			08
	a)	Mention Modes of Measurements for i) H.Y.S.D. ii) P.C.C.(1:2:4)	R	2	
	b)	Enlist purposes of Detailed Estimate	U	2	
	c)	What is the use of D.S.R.	U	1	
	d)	State Approximate Estimate for W.B.M. Road of 10 Km and Cinema theatre Building	A	1	
	e)	Explain center line method for taking out quantities	R	3	
	f)	State Data required for preparing Detailed Estimate	R	2	
Q.2		Attempt any **FOUR:**			16
	a)	What do you mean by check list, also give check list for building construction work (any 9 items of work)	R	1	
	b)	Prepare Approximate Estimate of a building having plinth area 125 sqm. By using following data. The cost of existing similar type of residential building having area 150 sqm. is Rs 25,00,000.	A	1	
	c)	State different types of detailed estimates and Explain any one in details	U	2	
	d)	Explain the terms – i) Provisional Sum ii) Prime Cost	A	2	
	e)	Prepare face sheet for construction of building work, amount as per abstract is 10 lacs, detailed estimate with their percentage	U	3	
	f)	What are the thumb rules for reinforcement quantity to be considered while framing estimate for R.C.C. Slab, Beam, Column, and Footing	R	3	
Q.3		Attempt any **Two:**			16
	a)	i) Prepare Approximate Estimate of a bridge having 4 spans of 42 m each using following data; Cost of existing bridge is 2 crores. Existing bridge is having 4 spans of 50 m each ii) Explain in detail cubical content method of approximate estimate with suitable example	A	1	
	b)	Fig No. 1 Shows a plan of a building and section of wall. Calculate the quantities of any two items of work given below by using P.W.D. method and enter in standard measurement sheet. Plinth height is 600 mm and depth of excavation is 1.52 Mt. i) Excavation for Foundation ii) U.C.R. in foundation and plinth iii) Mosaic Tile flooring iv) P.C.C. 1:3:6 for foundation	A	3	

Fig No 1

| | c) | An RCC Simply supported beam of size 230 mm x 650 mm is reinforced with 3 No of 20 mm dia. bar. (2 Main bars and 1 Bent up bar are placed in one row). Two anchor bars of 12 mm dia. are provided at top, 8 mm dia. stirrups are provided at 150 mm center to center. The overall length of beam is 6.0m Prepare Bar Bending Schedule. Consider effective cover as 30 mm, Steel used is Mild steel bars | A | 3 | |

P-2/4

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.
(An Autonomous Institute of Govt. Of Maharashtra)
WINTER/SUMMER-
EXAM SEAT NO.

LEVEL : - IV   PROGRAM :
COURSE CODE :- CEG 404/ CEF 404
COURSE NAME :- ESTIMATING AND COSTING
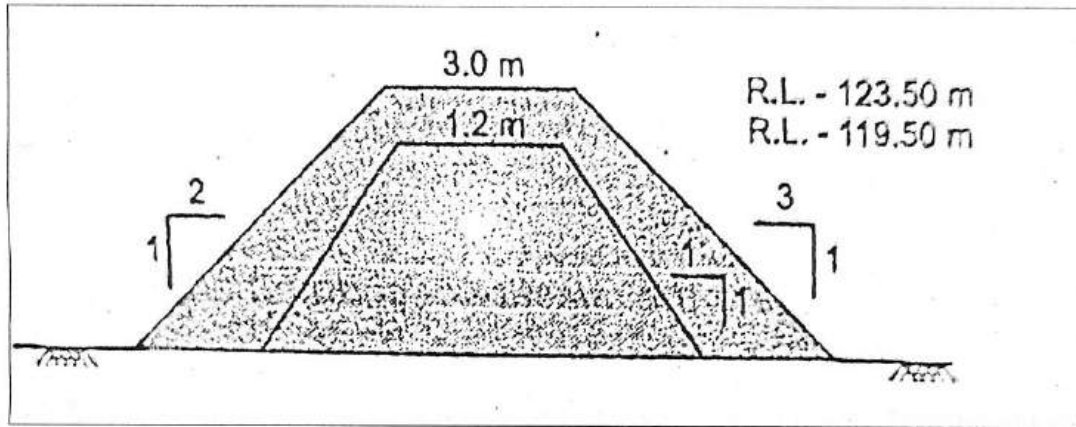MAX. MARKS : 80   TIME : 04 Hrs   DATE :- 02/12/23

QN	SQN	SECTION –II	R/U/A	Co CEG 404	Marks
Q.4		Attempt any **FOUR**:			08
	a)	Define specifications.	R	Co4	
	b)	Define taskwork.	R	Co5	
	c)	Define overheads and state its types.	R	Co5	
	d)	Give the task work for the following items i)12 mm thick plaster in C.M. ii)Brickwork in superstructure.	U	Co5	
	e)	State the prismoidal and Trapezoidal formula for the earthwork calculation with meaning of each abbreviation used in formula.	R	Co6	
	f)	List the different labours required for 10 m³ brickwork in superstructure.	A	Co5	
Q.5		Attempt any **FOUR**:			16
	a)	Calculate the quantity of earthwork in hearting and casing as shown in fig (2) for earthen dam using following data.Use mean area method.	A	Co6	
	b)	Calculate the quantities of cement, sand and aggregate required for RCC work of M15 grade. for 2 m³	A	Co5	
	c)	State the load carrying capacity of two bullock carts on pucca road for following materials i)cement ii) steel iii)Brick (19x9x9 cm) iv) sand.	U	Co5	
	d)	Explain in detail purpose of specifications.	U	Co4	
	e)	Give the current market rates for the following. i)Cement bag (of any brand available in market) ii)12mm steel bar iii) Burnt brick iv)Male majdoor.	A	Co5	
	f)	Explain i) General specification ii) Standard specification.	U	Co4	
Q.6		Attempt any **Two**			16
	a)	Prepare rate analysis for internal plaster with C.M.1:6 for a hall measuring 5m x 8m floor height upto slab bottom 3m.	A	Co5	
	b)	Draft the detailed specification for 1ˢᵗ class brickwork.	A	Co4	
	c)	Calculate the quantities of earth work in cutting and in banking for a portion of road 100 m long with following data: i)Formation width of road is 10 m. ii)Formation level of starting chainage is 161.6 m. iii)Road surface shall be given a rising gradient of 1 in 100. iv)side slopes are 1V:2.5H in banking and 1V:2H in cutting. Use mid sectional area method.	A	Co6	

For Q.5 a):

Chainage in (m)	60	80
GL in (m)	101.50	107.50

For Q.6 c):

Chainage (m)	0	20	40	60	80	100
GL (m)	161.5	160.90	160.55	161.55	161.85	162.92

LEVEL : - IV   PROGRAM :

COURSE CODE :- CEG 404

COURSE NAME :- ESTIMATING AND COSTING

MAX. MARKS : 80   TIME : **04 Hrs**   DATE :-   /   /

3.0 m

1.2 m

R.L. - 123.50 m
R.L. - 119.50 m

2

1

3

1

1

1

Fig (2)

P-414

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER- 2023

EXAM SEAT NO.

LEVEL : - IV   PROGRAM : Civil Engineering

COURSE CODE :- CEG 404 / CEF 404

COURSE NAME :- Estimating and Costing

MAX. MARKS : 80   TIME : 04 Hrs   DATE :- 02/12/23

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

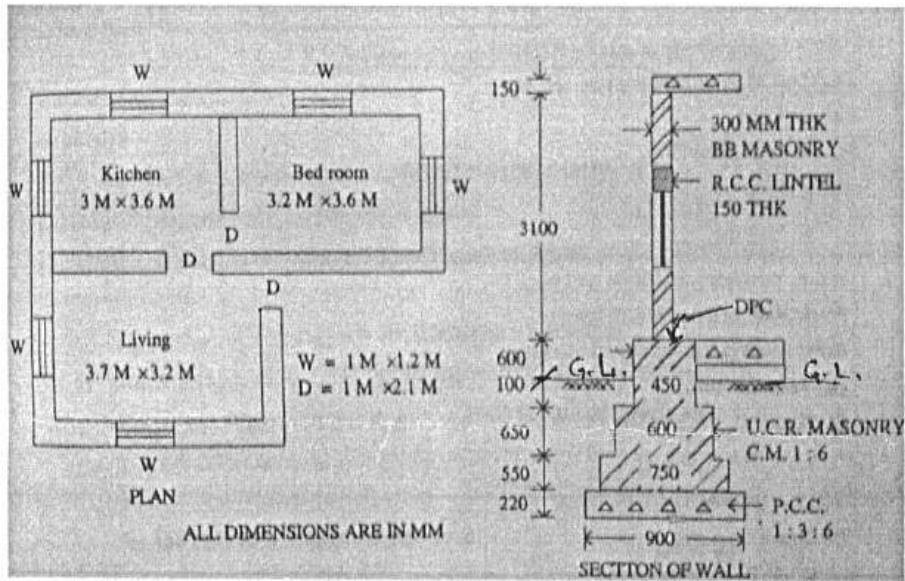| QN	SQN	SECTION -I	R/U/A	Co CEG 404	Marks
Q.1		Attempt any **FOUR**:			08
	a)	Mention Modes of Measurements for i) H.Y.S.D. ii) P.C.C.(1:2:4)	R	2	
	b)	Enlist purposes of Detailed Estimate	U	2	
	c)	What is the use of D.S.R.	U	1	
	d)	State Approximate Estimate for W.B.M. Road of 10 Km and Cinema theatre Building	A	1	
	e)	Explain center line method for taking out quantities	R	3	
	f)	State Data required for preparing Detailed Estimate	R	2	
Q.2		Attempt any **FOUR**:			16
	a)	What do you mean by check list, also give check list for building construction work (any 9 items of work)	R	1	
	b)	Prepare Approximate Estimate of a building having plinth area 125 sqm. By using following data. The cost of existing similar type of residential building having area 150 sqm. is Rs 25,00,000.	A	1	
	c)	State different types of detailed estimates and Explain any one in details	U	2	
	d)	Explain the terms – i) Provisional Sum ii) Prime Cost	A	2	
	e)	Prepare face sheet for construction of building work, amount as per abstract is 10 lacs, detailed estimate with their percentage	U	3	
	f)	What are the thumb rules for reinforcement quantity to be considered while framing estimate for R.C.C. Slab, Beam, Column, and Footing	R	3	
Q.3		Attempt any **Two**:			16
	a)	i) Prepare Approximate Estimate of a bridge having 4 spans of 42 m each using following data; Cost of existing bridge is 2 crores. Existing bridge is having 4 spans of 50 m each ii) Explain in detail cubical content method of approximate estimate with suitable example	A	1	
	b)	Fig No. 1 Shows a plan of a building and section of wall. Calculate the quantities of any two items of work given below by using P.W.D. method and enter in standard measurement sheet. Plinth height is 600 mm and depth of excavation is 1.52 Mt. i) Excavation for Foundation ii) U.C.R. in foundation and plinth iii) Mosaic Tile flooring iv) P.C.C. 1:3:6 for foundation	A	3	

Fig No 1

	c)	An RCC Simply supported beam of size 230 mm x 650 mm is reinforced with 3 No of 20 mm dia. bar. (2 Main bars and 1 Bent up bar are placed in one row). Two anchor bars of 12 mm dia. are provided at top, 8 mm dia. stirrups are provided at 150 mm center to center. The overall length of beam is 6.0m Prepare Bar Bending Schedule. Consider effective cover as 30 mm, Steel used is Mild steel bars	A	3	

P-2/4

LEVEL :- IV   PROGRAM :
COURSE CODE :- CEG 404/ CEF 404
COURSE NAME :- ESTIMATING AND COSTING
MAX. MARKS : 80   TIME : 04 Hrs   DATE :- 02/12/23

QN	SQN	SECTION –II	R/U/A	Co CEG 404	Marks
Q.4		Attempt any **FOUR:**			08
	a)	Define specifications.	R	Co4	
	b)	Define taskwork.	R	Co5	
	c)	Define overheads and state its types.	R	Co5	
	d)	Give the task work for the following items i)12 mm thick plaster in C.M. ii)Brickwork in superstructure.	U	Co5	
	e)	State the prismoidal and Trapezoidal formula for the earthwork calculation with meaning of each abbreviation used in formula.	R	Co6	
	f)	List the different labours required for 10 m³ brickwork in superstructure.	A	Co5	
Q.5		Attempt any **FOUR:**			16
	a)	Calculate the quantity of earthwork in hearting and casing as shown in fig (2) for earthen dam using following data.Use mean area method. <table><tr><td>Chainage in (m)</td><td>60</td><td>80</td></tr><tr><td>GL in (m)</td><td>101.50</td><td>107.50</td></tr></table>	A	Co6	
	b)	Calculate the quantities of cement, sand and aggregate required for RCC work of M15 grade. for 2m3	A	Co5	
	c)	State the load carrying capacity of two bullock carts on pucca road for following materials i)cement ii) steel iii)Brick (19x9x9 cm) iv) sand.	U	Co5	
	d)	Explain in detail purpose of specifications.	U	Co4	
	e)	Give the current market rates for the following. i)Cement bag (of any brand available in market) ii)12mm steel bar iii) Burnt brick iv)Male majdoor.	A	Co5	
	f)	Explain i) General specification ii) Standard specification.	U	Co4	
Q.6		Attempt any **Two**			16
	a)	Prepare rate analysis for internal plaster with C.M.1:6 for a hall measuring 5m x 8m floor height upto slab bottom 3m.	A	Co5	
	b)	Draft the detailed specification for 1ˢᵗ class brickwork.	A	Co4	
	c)	Calculate the quantities of earth work in cutting and in banking for a portion of road 100 m long with following data: i)Formation width of road is 10 m. ii)Formation level of starting chainage is 161.6 m. iii)Road surface shall be given a rising gradient of 1 in 100. iv)side slopes are 1V:2.5H in banking and 1V:2H in cutting. Use mid sectional area method. <table><tr><td>Chainage (m)</td><td>0</td><td>20</td><td>40</td><td>60</td><td>80</td><td>100</td></tr><tr><td>GL (m)</td><td>161.5</td><td>160.90</td><td>160.55</td><td>161.55</td><td>161.85</td><td>162.92</td></tr></table>	A	Co6	

LEVEL : - IV   PROGRAM :
COURSE CODE :- CEG 404
COURSE NAME :- ESTIMATING AND COSTING
MAX. MARKS : **80**   TIME : **04 Hrs**   DATE :-   /   /
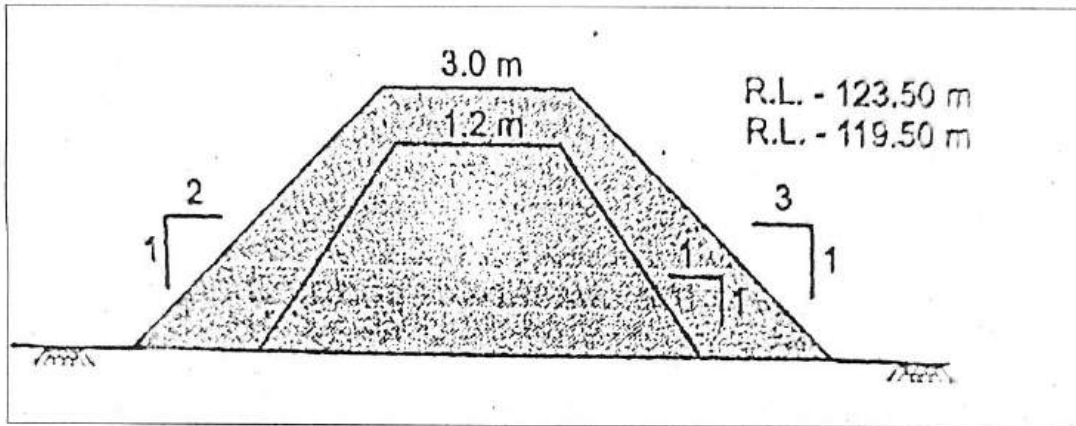

Fig (2)

P-414

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)
WINTER/SUMMER- 2023
EXAM SEAT NO.

LEVEL :- THIRD   PROGRAM : CIVIL ENGINEERING
COURSE CODE :- CEG310
COURSE NAME :- TRANSPORTATION ENGINEERING
MAX. MARKS : 80   TIME : 03 Hrs   DATE :- 04/12/ 23

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	SQN		R/U/A	Co CEG310	Marks
Q.1		Attempt any **FOUR:**			08
	a)	Define superelevation.	R	1	
	b)	State the meaning of traffic volume study.	U	1	
	c)	State any four objectives of providing camber.	U	1	
	d)	Differentiate any four points between flexible and rigid pavements.	R	2	
	e)	Write any four disadvantages of tunnel.	R	3	
	f)	State any four purpose of shaft construction.	U	3	
Q.2		Attempt any **FOUR:**			16
	a)	Draw a typical cross section of highway in embankment and show all components.	A	1	
	b)	State the necessity of providing shoulder and write minimum width of shoulder as per IRC.	A	1	
	c)	Define: i)Tack coat ii)Tar iii) Cutback iv) Asphalt.	R	2	
	d)	Describe the brief construction procedure of WBM road.	A	2	
	e)	Draw the given shape of tunnels and write its suitability i) Rectangular tunnel ii) Egg type shape.	U/A	3	
	f)	Describe the procedure of construction of tunnels in hard rock with Full face heading method.	A	3	
Q.3		Attempt any **FOUR:**			16
	a)	State any eight factors which control the alignment of road in plain area.	U	1	
	b)	Define gradient. Explain its significance in road alignment.	A	1	
	c)	Draw a neat sketch showing details of expansion joint & contraction joint in concrete roads.	U	2	
	d)	Explain construction procedure for bituminous carpet road with the list of materials used for its construction.	A	2	
	e)	Discuss with a neat sketch the procedure of setting out the tunnel alignment on ground.	A	3	
	f)	Explain the following terms - i)Mucking ii) Tunnel lining	U	3	

QN	SQN	Question Text	R/U/A	Co CEG 310	Marks
Q.4		Attempt any **FOUR**:			08
	a)	Define Creep of rail.	R	4	
	b)	Draw a neat labelled sketch of flat footed rails with dimension.	U	4	
	c)	State any four purpose of providing railway stations.	U	5	
	d)	Define railway station.	R	5	
	e)	Define 'free board'.	R	6	
	f)	Define 'Scour and afflux' of bridge.	R	6	
Q.5		Attempt any **FOUR**:			16
	a)	State any eight ideal requirement of permanent way.	U	4	
	b)	Define i) Tongue Rail ii) Wind Rail iii) check Rail iv) Nose of crossing.	U	5	
	c)	Define 'terminal station'. Draw a neat sketch of terminal station.	A	5	
	d)	State the necessity of bearing in bridge. Enlist any four types of bearing suitable for RCC girder bridge.	A	6	
	e)	Define the term i) Scour ii) Afflux iii) Water way iv) Economic span	U	6	
	f)	Explain the term simple suspension bridge with neat sketch.	A	6	
Q.6		Attempt any **FOUR**:			16
	a)	State any four advantages of concrete sleeper.	U	4	
	b)	Explain in brief why conning of wheels is necessary.	A	4	
	c)	Draw any four types of fixtures and fastening used in permanent way.	A	4	
	d)	Draw the neat sketch of fish plate for joining flat footed rails.	U	4	
	e)	Explain working of locomotive yard with neat sketch.	U	5	
	f)	Define the term 'bridge alignment'. State any four factors that are considered while locating bridge alignment.	A	6	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER- 2023

EXAM SEAT NO.

LEVEL :- THIRD   PROGRAM : CIVIL ENGINEERING
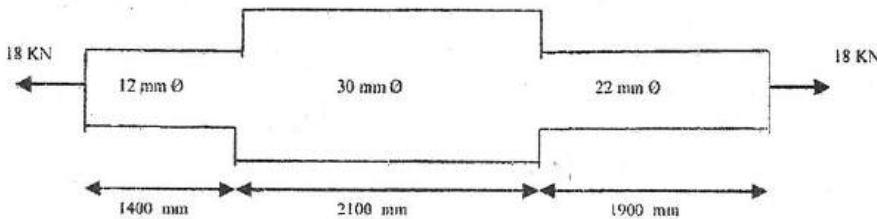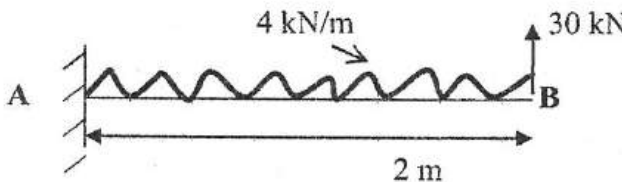COURSE CODE :- CEG310
COURSE NAME :- TRANSPORTATION ENGINEERING
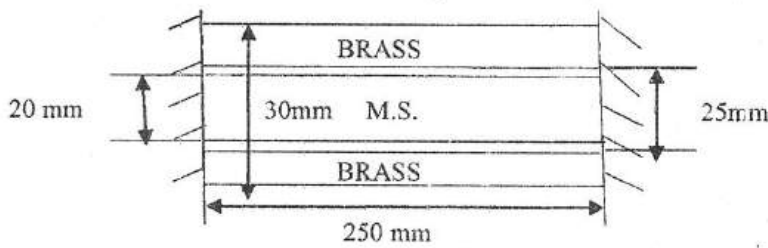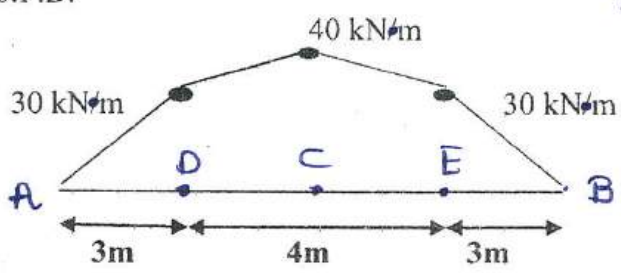MAX. MARKS : 80   TIME : 03 Hrs   DATE :- 04/12/23

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	SQN		R/U/A	Co CEG310	Marks
Q.1		Attempt any **FOUR:**			08
	a)	Define superelevation.	R	1	
	b)	State the meaning of traffic volume study.	U	1	
	c)	State any four objectives of providing camber.	U	1	
	d)	Differentiate any four points between flexible and rigid pavements.	R	2	
	e)	Write any four disadvantages of tunnel.	R	3	
	f)	State any four purpose of shaft construction.	U	3	
Q.2		Attempt any **FOUR:**			16
	a)	Draw a typical cross section of highway in embankment and show all components.	A	1	
	b)	State the necessity of providing shoulder and write minimum width of shoulder as per IRC.	A	1	
	c)	Define: i)Tack coat ii)Tar iii) Cutback iv) Asphalt.	R	2	
	d)	Describe the brief construction procedure of WBM road.	A	2	
	e)	Draw the given shape of tunnels and write its suitability i) Rectangular tunnel ii) Egg type shape.	U/A	3	
	f)	Describe the procedure of construction of tunnels in hard rock with Full face heading method.	A	3	
Q.3		Attempt any **FOUR:**			16
	a)	State any eight factors which control the alignment of road in plain area.	U	1	
	b)	Define gradient. Explain its significance in road alignment.	A	1	
	c)	Draw a neat sketch showing details of expansion joint & contraction joint in concrete roads.	U	2	
	d)	Explain construction procedure for bituminous carpet road with the list of materials used for its construction.	A	2	
	e)	Discuss with a neat sketch the procedure of setting out the tunnel alignment on ground.	A	3	
	f)	Explain the following terms - i)Mucking ii) Tunnel lining	U	3	

QN	SQN	Question Text	R/U/A	Co CEG 310	Marks
Q.4		Attempt any **FOUR**:			08
	a)	Define Creep of rail.	R	4	
	b)	Draw a neat labelled sketch of flat footed rails with dimension.	U	4	
	c)	State any four purpose of providing railway stations.	U	5	
	d)	Define railway station.	R	5	
	e)	Define 'free board'.	R	6	
	f)	Define 'Scour and afflux' of bridge.	R	6	
Q.5		Attempt any **FOUR**:			16
	a)	State any eight ideal requirement of permanent way.	U	4	
	b)	Define i) Tongue Rail ii) Wind Rail iii) check Rail iv) Nose of crossing.	U	5	
	c)	Define 'terminal station'. Draw a neat sketch of terminal station.	A	5	
	d)	State the necessity of bearing in bridge. Enlist any four types of bearing suitable for RCC girder bridge.	A	6	
	e)	Define the term i) Scour ii) Afflux iii) Water way iv) Economic span	U	6	
	f)	Explain the term simple suspension bridge with neat sketch.	A	6	
Q.6		Attempt any **FOUR**:			16
	a)	State any four advantages of concrete sleeper.	U	4	
	b)	Explain in brief why conning of wheels is necessary.	A	4	
	c)	Draw any four types of fixtures and fastening used in permanent way.	A	4	
	d)	Draw the neat sketch of fish plate for joining flat footed rails.	U	4	
	e)	Explain working of locomotive yard with neat sketch.	U	5	
	f)	Define the term 'bridge alignment'. State any four factors that are considered while locating bridge alignment.	A	6	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER- 2023

EXAM SEAT NO.

LEVEL : - 3   PROGRAM : CIVIL ENGINEERING

COURSE CODE :- CEG307
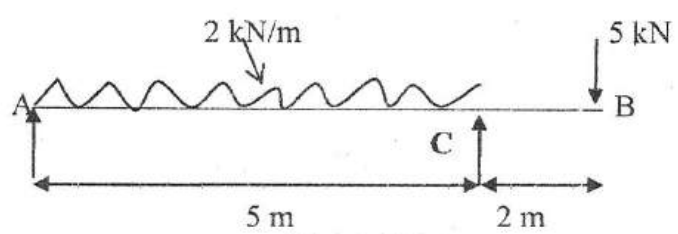
COURSE NAME :- MECHANICS OF STRUCTURES

MAX. MARKS : 80   TIME : 03 Hrs   DATE :-04/12/23

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	SQN		R/U/A	Co	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Enlist any four types of structural materials based on their physical properties.	R	1	
	b)	Draw a stress-strain diagram for M.S. and mark salient points on it.	A	2	
	c)	Enlist any four types of loading on beams with sketches.	R	3	
	d)	Distinguish between Bi-axial and Tri-axial loading with figures.	U	2	
	e)	State the relation between B.M. and S.F. and rate of loading.	R	3	
	f)	Enlist any four basic requirements of a structure.	R	1	
Q.2		Attempt any **FOUR:**			**16**
	a)	Explain structural Analysis and structural Design.	R	1	
	b)	A stepped bar is pulled by 18 kN as shown in figure A. Find the total elongation of bar. If $E = 1 \times 10^5$ N/mm^2 Figure A	U	2	
	c)	A steel bar 200 mm long, 30 mm x 30 mm in cross-section is subjected to a stress of 100 MPa along the length and 40 MPa on other two faces. All stresses are tensile. The change in volume of bar is 125 mm^3 under the tri-axial stress system. If E = 120 GPa, Find Poisson's ratio.	A	2	
	d)	Draw S.F. and B.M. diagram for the beam as shown in Figure B and also locate point of zero S.F. and point of contra flexure. Figure B	A	3	
	e)	A cantilever beam ABCD is fixed at A and free at D such that AB = 1 m, BC = 2 m, CD = 3.5 m. it carries an u.d.l. of 150 kN/m from B to D along with a point load of 500 kN at point C. Draw shear force and bending moment diagram for this beam.	A	3	
	f)	Explain any four types of structures and their functions.	U	1	

QN	SQN	SECTION -I	R/U/A	Co	Marks
Q.3		Attempt any **FOUR:**			**16**
	a)	A steel rod 18 mm in diameter passes centrally through a steel tube 20 mm in internal diameter and 30 mm in external diameter. The tube is 750 mm long and is closed by rigid washers of negligible thickness which are fastened by nuts threaded on the rod. Find the stresses induced in the rod and tube when one, nut is tightened by one quarter of turn relative to other. There are 4 threads per 10 mm. Take $E = 200$ kN/mm^2 for rod and the tube.	A	2	
	b)	A mild steel bar as shown in Figure C is 20 mm in diameter and 250 mm long. It is encased inside a brass tube of the same length whose external and internal diameters are 30 mm and 25 mm respectively. The composite bar fixed at its ends is heated through 50 ^{0}C. Find the stresses induced in each material. Assume $\alpha s = 11 \times 10^{-6}$ per ^{0}C, $\alpha b = 16.5 \times 10^{-6}$ per ^{0}C, $Es = 200$ kN/mm^2, $Eb = 100$ kN/mm^2. Comment on the net extension of the composite bar. Figure C	A	2	
	c)	Enlist any four types of structural actions with example for each action.	R	1	
	d)	Define Poisson's ratio and state the relation between E, G and K.	R	2	
	e)	Figure D Shows B.M.D. for simply supported beam carrying three point loads at D, E and at mid-point of DE. ~~Find the value rate of UDL and~~ point loads and draw S.F.D. Find Figure D	A	3	
	f)	Draw the S.F. and B.M. diagrams for the beam as shown in Figure E and locate zero S.F. and point of Contra flexure. Figure E	A	3	

QN	SQN	Question Text	R/U/A	Co CEG 307	Marks
Q.4		Attempt any **FOUR**:			08
	a)	Define area M.I. of any section having area about its principal centriodal axis.	R	4	
	b)	State the expression for Radius of gyration stating the meaning of each term involved.	A	4	
	c)	Write the flexural formula stating the meaning of each term involved.	U	5	
	d)	What is the relation between maximum and average shear stress for the circular section carrying shear force.	R	5	
	e)	Write the expression for elastic section modulus for a rectangular section about y-y axis.	U	5	
	f)	Define Modulus of Resilience and write the expression for the same.	R	6	
Q.5		Attempt any **FOUR**:			16
	a)	A circular section has the diameter 160mm. If the section has to resist a load of 15 KN/m over 3m s/s span. Find the extreme stress in the section.	A	5	
	b)	A T section has flanges 60mm X 20mm and web 20mm by 40mm. Determine the MI of the section above both the centriodal axes.	A	5	
	c)	An I section has flanges 200mm X 10mm and web 10mm X 90mm. Find the max BM the section carry with permissible banding stress as 100MPa.	A	5	
	d)	Plot the shear stress across the above section, if the SF is 60KN. (Flanges 200 mm X 10mm and web 10mm X 90mm)	A	5	
	e)	Differential between pure bending and ordinary bending of a beam. Write the expression for curvature for both the bending.	U	5	
	f)	Define i) Proof Relisilience and ii) Determine the energy stared in the member having proof steam 120 MPa and Eas 200 GPa, having c/s 25mm X 25mm and length 2m.	A	6	
Q.6		Attempt any **FOUR**:			16
	a)	A rectangular section has inside dimensions 200mm X 300 mm, outside dimensions 300mm X 400mm. Determine the MI about both the centriodal axes for the hollow rectangular section.	A	4	
	b)	A hollow circular shaft has outer diameter 60mm and inside diameter 40mm. Find the extreme stress of the section carry Max BM of 12.5 KNm.	A	4	
	c)	Plot the shear stress across a T-section 120mm X 30mm flange and 30mm X 60mm web, carrying SF and 100 KN.	A	5	
	d)	Find the instantaneous stress developed in a member hang vertically carrying collar its end over which 100N falls through 300mm height, take the dimension as 25mm, length of the rod as 1.5m and E as 200 GPa for the material.	A	6	
	e)	Write the ~~flexure~~ formula stating the meaning of the each terms involved. tossional	A	5	
	f)	A rectangular flat 25mm X 45 mm, carries 10KN/m over 3m span. Determine the extreme stresses the section.	A	5	

P-3/3

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER- 2023

EXAM SEAT NO.

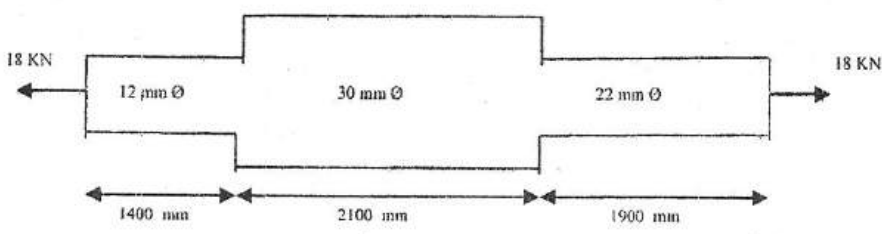LEVEL :- 3   PROGRAM : CIVIL ENGINEERING
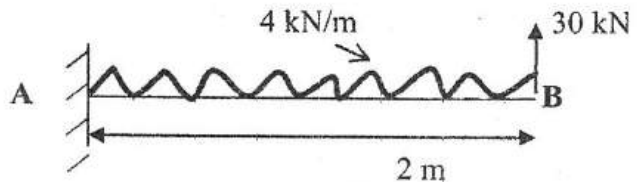COURSE CODE :- CEG307
COURSE NAME :- MECHANICS OF STRUCTURES
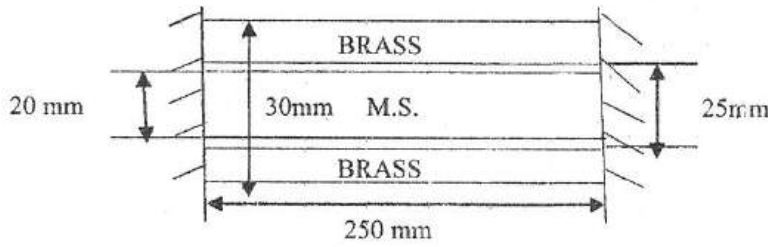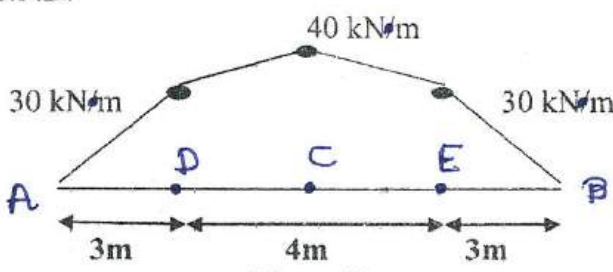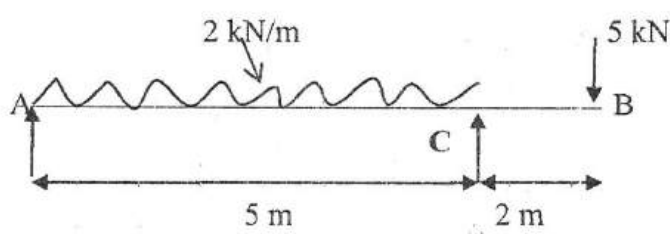MAX. MARKS : 80   TIME : 03 Hrs   DATE :-04/12/23

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	SQN		R/U/A	Co	Marks
Q.1		Attempt any **FOUR**:			08
	a)	Enlist any four types of structural materials based on their physical properties.	R	1	
	b)	Draw a stress-strain diagram for M.S. and mark salient points on it.	A	2	
	c)	Enlist any four types of loading on beams with sketches.	R	3	
	d)	Distinguish between Bi-axial and Tri-axial loading with figures.	U	2	
	e)	State the relation between B.M. and S.F. and rate of loading.	R	3	
	f)	Enlist any four basic requirements of a structure.	R	1	
Q.2		Attempt any **FOUR**:			16
	a)	Explain structural Analysis and structural Design.	R	1	
	b)	A stepped bar is pulled by 18 kN as shown in figure A. Find the total elongation of bar. If $E = 1 \times 10^5$ N/mm^2 18 KN ← 12 mm Ø 30 mm Ø 22 mm Ø → 18 KN 1400 mm 2100 mm 1900 mm **Figure A**	U	2	
	c)	A steel bar 200 mm long, 30 mm x 30 mm in cross-section is subjected to a stress of 100 MPa along the length and 40 MPa on other two faces. All stresses are tensile. The change in volume of bar is 125 mm^3 under the tri-axial stress system. If E = 120 GPa, Find Poisson's ratio.	A	2	
	d)	Draw S.F. and B.M. diagram for the beam as shown in Figure B and also locate point of zero S.F. and point of contra flexure. 4 kN/m 30 kN A ⟋⟋⟋⟋⟋⟋ B 2 m **Figure B**	A	3	
	e)	A cantilever beam ABCD is fixed at A and free at D such that AB = 1 m, BC = 2 m, CD = 3.5 m. it carries an u.d.l. of 150 kN/m from B to D along with a point load of 500 kN at point C. Draw shear force and bending moment diagram for this beam.	A	3	
	f)	Explain any four types of structures and their functions.	U	1	

QN	SQN	SECTION -I	R/U/A	Co	Marks
Q.3		Attempt any **FOUR**:			16
	a)	A steel rod 18 mm in diameter passes centrally through a steel tube 20 mm in internal diameter and 30 mm in external diameter. The tube is 750 mm long and is closed by rigid washers of negligible thickness which are fastened by nuts threaded on the rod. Find the stresses induced in the rod and tube when one, nut is tightened by one quarter of turn relative to other. There are 4 threads per 10 mm. Take $E = 200$ kN/mm^2 for rod and the tube.	A	2	
	b)	A mild steel bar as shown in Figure C is 20 mm in diameter and 250 mm long. It is encased inside a brass tube of the same length whose external and internal diameters are 30 mm and 25 mm respectively. The composite bar fixed at its ends is heated through 50 ^{0}C. Find the stresses induced in each material. Assume $\alpha s = 11 \times 10^{-6}$ per ^{0}C, $\alpha b = 16.5 \times 10^{-6}$ per ^{0}C, $Es = 200$ kN/mm^2, $Eb = 100$ kN/mm^2. Comment on the net extension of the composite bar.	A	2	

Figure C

	c)	Enlist any four types of structural actions with example for each action.	R	1	
	d)	Define Poisson's ratio and state the relation between E, G and K.	R	2	
	e)	Figure D Shows B.M.D. for simply supported beam carrying three point loads at D, E and at mid-point of DE. ~~Find the value rate of UDL and~~ point loads and draw S.F.D. Find	A	3	

Figure D

| | f) | Draw the S.F. and B.M. diagrams for the beam as shown in Figure E and locate zero S.F. and point of Contra flexure. | A | 3 | |

Figure E

P-2/3

QN	SQN	Question Text	R/U/A	Co CEG 307	Marks
Q.4		Attempt any **FOUR:**			08
	a)	Define area M.I. of any section having area about its principal centriodal axis.	R	4	
	b)	State the expression for Radius of gyration stating the meaning of each term involved.	A	4	
	c)	Write the flexural formula stating the meaning of each term involved.	U	5	
	d)	What is the relation between maximum and average shear stress for the circular section carrying shear force.	R	5	
	e)	Write the expression for elastic section modulus for a rectangular section about y-y axis.	U	5	
	f)	Define Modulus of Resilience and write the expression for the same.	R	6	
Q.5		Attempt any **FOUR:**			16
	a)	A circular section has the diameter 160mm. If the section has to resist a load of 15 KN/m over 3m s/s span. Find the extreme stress in the section.	A	5	
	b)	A T section has flanges 60mm X 20mm and web 20mm by 40mm. Determine the MI of the section above both the centriodal axes.	A	5	
	c)	An I section has flanges 200mm X 10mm and web 10mm X 90mm. Find the max BM the section carry with permissible banding stress as 100MPa.	A	5	
	d)	Plot the shear stress across the above section, if the SF is 60KN. (Flanges 200 mm X 10mm and web 10mm X 90mm)	A	5	
	e)	Differential between pure bending and ordinary bending of a beam. Write the expression for curvature for both the bending.	U	5	
	f)	Define i) Proof Relisilience and ii) Determine the energy stared in the member having proof steam 120 MPa and Eas 200 GPa, having c/s 25mm X 25mm and length 2m.	A	6	
Q.6		Attempt any **FOUR:**			16
	a)	A rectangular section has inside dimensions 200mm X 300 mm, outside dimensions 300mm X 400mm. Determine the MI about both the centriodal axes for the hollow rectangular section.	A	4	
	b)	A hollow circular shaft has outer diameter 60mm and inside diameter 40mm. Find the extreme stress of the section carry Max BM of 12.5 KNm.	A	4	
	c)	Plot the shear stress across a T-section 120mm X 30mm flange and 30mm X 60mm web, carrying SF and 100 KN.	A	5	
	d)	Find the instantaneous stress developed in a member hang vertically carrying collar its end over which 100N falls through 300mm height, take the dimension as 25mm, length of the rod as 1.5m and E as 200 GPa for the material.	A	6	
	e)	Write the ~~flexure~~ formula stating the meaning of the each terms involved. torsional	A	5	
	f)	A rectangular flat 25mm X 45 mm, carries 10KN/m over 3m span. Determine the extreme stresses the section.	A	5	

P-3/3

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER- 2023

EXAM. SEAT NO.

LEVEL : - FIFTH   PROGRAM :Diploma in Civil Engineering

COURSE CODE :- CEG 504/CEF504

COURSE NAME :- CONTRACTS & ACCOUNTS

MAX. MARKS : 80   TIME : 03 Hrs   DATE :-05/12/2023

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN.	S. QN	SECTION -I	R/U /A	CO	Marks
Q.1		Attempt any **FOUR:**			08
	a)	Give classification of PWD works?	R	CEG504-01	
	b)	Define the term-Technical sanction.	R	CEG504-01	
	c)	Enlist the documents required for lump sum contract.	R	CEG504-02	
	d)	Give the meaning of term defect liability period	R	CEG504-02	
	e)	State the Procedure of preparing tender.	R	CEG504-03	
	f)	State the necessity of tender.	R	CEG504-03	
Q.2		Attempt any **FOUR:**			16
	a)	Explain administrative approval and technical sanction.	U	CEG504-01	
	b)	Explain in brief nominal muster roll.	U	CEG504-01	
	c)	Explain the procedure for registration of contractor.	U	CEG504-02	
	d)	Describe earnest money deposit.	R	CEG504-02	
	e)	State any four reasons of rejection of all tenders.	U	CEG504-03	
	f)	Give the list of information given in tender notice.	R	CEG504-03	
Q.3		Attempt any **FOUR:**			16
	a)	State the various methods of execution of work in PWD.	R	CEG504-01	
	b)	Explain BOT with one example.	U	CEG504-01	
	c)	Describe the condition of contract- extension of time limit and defective material and workmanship.	U	CEG504-02	
	d)	Explain negotiated contract with their advantages & disadvantages.	U	CEG504-02	
	e)	State the points included while drafting a tender notice	R	CEG504-03	
	f)	Define tender and states its necessity	R	CEG504-03	

P.T.O.

LEVEL : - FIFTH   PROGRAM : CIVIL ENGINEERING
COURSE CODE :- CEG504 / CEF504
COURSE NAME :- CONTRACTS AND ACCOUNTS
MAX. MARKS : 80   TIME : 03 Hrs   DATE :- 05/12/23

QN	S QN	SECTION –II	R/ U/ A	Co	Marks
Q.4		Attempt any **FOUR**:			08
	a)	State the different types of Capitals.	R	CEG504-4	
	b)	Enlist the features of NMR.	R	CEG504-5	
	c)	State any two uses of cashbook.	R	CEG504-5	
	d)	Define the term Obsolescence.	R	CEG504-6	
	e)	State the necessity of Valuation.	R	CEG504-6	
	f)	Define the term i) Market Value ii) Book Value.	R	CEG504-6	
Q.5		Attempt any **FOUR**:			16
	a)	State and describe types of taxes.	R	CEG504-4	
	b)	State objectives and functions of financial management.	R	CEG504-4	
	c)	Describe in detail i) Excise tax ii) VAT	U	CEG504-4	
	d)	Differentiate between Interim payment and First and final payment.	U	CEG504-5	
	e)	Define MB. State its importance.	U	CEG504-5	
	f)	Explain in brief secured advance and retention money.	U	CEG504-5	
Q.6		Attempt any **FOUR**:			16
	a)	Define Valuation and state its necessity.	U	CEG504-6	
	b)	State and describe factors affecting on Value.	U	CEG504-6	
	c)	Enlist various methods of depreciation and explain any one.	R	CEG504-6	
	d)	Describe in detail year purchase and sinking fund.	U	CEG504-6	
	e)	A property have monthly rent of Rs.1000.The outgoings are as below, sinking fund installment Rs. 80/- annum repair Rs. 1000/ other Outgoings =20% of gross income. Calculate Capitalized Value if rate of interest is 6%	A	CEG504-6	
	f)	The building was purchased for Rs. 500000. Assume life of building 55 years. Calculate depreciated cost of it after 15 years assume salvage value is 10% of purchase cost. Use straight line method of Depreciation.	A	CEG504-6	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER- 2023

EXAM. SEAT NO.

LEVEL : - FIFTH   PROGRAM :Diploma in Civil Engineering

COURSE CODE :- CEG 504/CEF504

COURSE NAME :- CONTRACTS & ACCOUNTS

MAX. MARKS : 80   TIME : 03 Hrs   DATE :-05/12/2023

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN.	S. QN	SECTION -I	R/U /A	CO	Marks
Q.1		Attempt any **FOUR:**			08
	a)	Give classification of PWD works?	R	CEG504-01	
	b)	Define the term-Technical sanction.	R	CEG504-01	
	c)	Enlist the documents required for lump sum contract.	R	CEG504-02	
	d)	Give the meaning of term defect liability period	R	CEG504-02	
	e)	State the Procedure of preparing tender.	R	CEG504-03	
	f)	State the necessity of tender. *Types.*	R	CEG504-03	
Q.2		Attempt any **FOUR:**			16
	a)	Explain administrative approval and technical sanction.	U	CEG504-01	
	b)	Explain in brief nominal muster roll.	U	CEG504-01	
	c)	Explain the procedure for registration of contractor.	U	CEG504-02	
	d)	Describe earnest money deposit.	R	CEG504-02	
	e)	State any four reasons of rejection of all tenders.	U	CEG504-03	
	f)	Give the list of information given in tender notice.	R	CEG504-03	
Q.3		Attempt any **FOUR:**			16
	a)	State the various methods of execution of work in PWD.	R	CEG504-01	
	b)	Explain BOT with one example.	U	CEG504-01	
	c)	Describe the condition of contract- extension of time limit and defective material and workmanship.	U	CEG504-02	
	d)	Explain negotiated contract with their advantages & disadvantages.	U	CEG504-02	
	e)	State the points included while drafting a tender notice	R	CEG504-03	
	f)	Define tender and states its necessity	R	CEG504-03	

P.T.O.

LEVEL : - FIFTH   PROGRAM : CIVIL ENGINEERING
COURSE CODE :- CEG504 / CEF504
COURSE NAME :- CONTRACTS AND ACCOUNTS
MAX. MARKS : 80   TIME : 03 Hrs   DATE :- 05/12/23

QN	S QN	SECTION –II	R/ U/ A	Co	Marks
Q.4		Attempt any **FOUR:**			08
	a)	State the different types of Capitals.	R	CEG504-4	
	b)	Enlist the features of NMR.	R	CEG504-5	
	c)	State any two uses of cashbook.	R	CEG504-5	
	d)	Define the term Obsolescence.	R	CEG504-6	
	e)	State the necessity of Valuation.	R	CEG504-6	
	f)	Define the term i) Market Value ii) Book Value.	R	CEG504-6	
Q.5		Attempt any **FOUR:**			16
	a)	State and describe types of taxes.	R	CEG504-4	
	b)	State objectives and functions of financial management.	R	CEG504-4	
	c)	Describe in detail i) Excise tax ii) VAT	U	CEG504-4	
	d)	Differentiate between Interim payment and First and final payment.	U	CEG504-5	
	e)	Define MB. State its importance.	U	CEG504-5	
	f)	Explain in brief secured advance and retention money.	U	CEG504-5	
Q.6		Attempt any **FOUR:**			16
	a)	Define Valuation and state its necessity.	U	CEG504-6	
	b)	State and describe factors affecting on Value.	U	CEG504-6	
	c)	Enlist various methods of depreciation and explain any one.	R	CEG504-6	
	d)	Describe in detail year purchase and sinking fund.	U	CEG504-6	
	e)	A property have monthly rent of Rs.1000.The outgoings are as below, sinking fund installment Rs. 80/- annum repair Rs. 1000/ other Outgoings =20% of gross income. Calculate Capitalized Value if rate of interest is 6%	A	CEG504-(	
	f)	The building was purchased for Rs. 500000. Assume life of building 55 years. Calculate depreciated cost of it after 15 years assume salvage value is 10% of purchase cost. Use straight line method of Depreciation.	A	CEG504-6	

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LEVEL :- FIFTH

COURSE CODE :- CEG506/ CEF507

COURSE NAME :- IRRIGATION ENGINEERING

PROGRAM : CIVIL ENGINEERING

MAX. MARKS : 80   TIME : 03 Hrs

DATE :-05/12/23

QN	SQN	SECTION –II	R/U/A	Co CEG506	Marks
Q.4		Attempt any **FOUR**:			08
	a)	Define term Capacity of reservoir.	R	4	
	b)	State the use of area capacity curve in fixing up the storage.	U	4	
	c)	State any two purposes of Inspection gallery in gravity dam.	R	5	
	d)	Write the functions of - i) Cut-off trench ii) Berms	U	5	
	e)	State any four effects of salt effloresce.	U	6	
	f)	Define canal lining.	R	6	
Q.5		Attempt any **FOUR**:			16
	a)	Name & define storages between different control levels with a neat sketch & state their effects on water planning.	A	4	
	b)	State the precautions & remedial measures you would undertake to control seepage through dam foundations with a neat sketch.	A	5	
	c)	Explain with illustrative sketch the working principle of ogee spillway.	U	5	
	d)	Discuss construction joints & contraction joints with a neat sketch	U	5	
	e)	State the ill effects of water logging. What steps are taken to prevent these ill-effects.	R	6	
	f)	State any four factors governing the choices of suitable type of cross drainage work.	U	6	
Q.6		Attempt any **FOUR**:			16
	a)	Fix the reservoir level FRL & TBL from following data I) Dead storage level - 110m II) Crop water requirements - 8500 m^3 III) Tank losses - 1500 m^3 IV) Free Board - 1.5m V) Flood lift - 1.70m VI) Assume any other data if required.	A	4	
	b)	Discuss the working of radial gates with a neat sketch.	U	5	
	c)	Explain the working of Energy Dissipators w.r.t. I) Where it is located II) What will happen if it is omitted.	A	5	
	d)	Draw a typical c/s of gravity dam showing details of different forces acting on it.	U	5	
	e)	Draw a sketch to show the section of partly filling & partly cutting canal.	U	6	
	f)	State under what situations each of following is constructed.. i)Level crossing ii) Aqueduct iii) Syphon Aqueduct iv) Inlet & outlet	A	6	

Table for Q.6 a):

Control RL	100 110	112	114	116	118	120
Capacity	1000	2900	5000	6000	9000	12000

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.
(An Autonomous Institute of Govt. Of Maharashtra)
WINTER/SUMMER- 2023
EXAM. SEAT NO.

LEVEL :- FIFTH   PROGRAM : Civil Engineering
COURSE CODE :- CEG506/CEF507
COURSE NAME :- Irrigation Engineering.
MAX. MARKS : 80   TIME : 03 Hrs   DATE :-05/12/23

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

Q.N	SQN	SECTION -I	R/U/A	CO	Marks
Q.1		Attempt any **FOUR**:			08
	a)	Define- i) Rainfall ii) Runoff	R	CEG506-1	
	b)	State the difference between Gross Command Area and Culturable Command Area.	U	CEG506-1	
	c)	Define- i) Base Period ii) Crop Period	R	CEG506-2	
	d)	State the relation between duty and delta for a given base period.	U	CEG506-2	
	e)	Enlist the different types of Bhandharas.	A	CEG506-3	
	f)	What do you mean by percolation tank?	R	CEG506-3	
Q.2		Attempt any **FOUR**:			16
	a)	Enlist types of Rain gauges. Explain any one with neat sketch.	R	CEG506-1	
	b)	State and describe factors affecting Run off from catchment area.	U	CEG506-1	
	c)	Sugarcane requires 75 cm in Kharif, 105 cm in Rabi and 125 cm in H.W. season. Calculate field duty in each season and mean annual duty.	A	CEG506-2	
	d)	State the factors affecting duty.	U	CEG506-2	
	e)	Enlist the factors affecting the selection of the site for Bandhara.	R	CEG506-3	
	f)	Draw the neat sketch of percolation tank	A	CEG506-3	
Q.3		Attempt any **FOUR**:			16
	a)	Explain how percolation tank differs from irrigation tank.	R	CEG506-3	
	b)	Explain Fan shaped catchment and Fern shaped catchment with neat sketch.	U	CEG506-1	
	c)	Compare the duties of the following irrigation systems and state, which one is more economical.	A	CEG506-2	
	d)	Describe sprinkler irrigation and drip irrigation methods.	U	CEG506-3	
	e)	Draw a layout of Bandhara irrigation scheme showing the catchment area, irrigation canal and other component parts.	R	CEG506-3	
	f)	What is Lift Irrigation? Enlist the component parts of lift irrigation.	U	CEG506-3	

Table for Q.3 c):

Data	First system	Second system
Commanded area	3000 ha	700 ha
Intensity of irrigation	40 %	60 %
Base Period	130 days	125 days
Discharge	4 cumecs	1.0 cumecs

LEVEL :- FIFTH

PROGRAM : CIVIL ENGINEERING

COURSE CODE :- CEG506/ CEF507

COURSE NAME :- IRRIGATION ENGINEERING

MAX. MARKS : 80   TIME : **03 Hrs**

DATE :-05/12/23

QN	S Q N	SECTION –II	R/ U/ A	Co CEG506	Marks
Q.4		Attempt any **FOUR**:			**08**
	a)	Define term Capacity of reservoir.	R	4	
	b)	State the use of area capacity curve in fixing up the storage.	U	4	
	c)	State any two purposes of Inspection gallery in gravity dam.	R	5	
	d)	Write the functions of - i) Cut-off trench ii) Berms	U	5	
	e)	State any four effects of salt effloresce.	U	6	
	f)	Define canal lining.	R	6	
Q.5		Attempt any **FOUR**:			**16**
	a)	Name & define storages between different control levels with a neat sketch & state their effects on water planning.	A	4	
	b)	State the precautions & remedial measures you would undertake to control seepage through dam foundations with a neat sketch.	A	5	
	c)	Explain with illustrative sketch the working principle of ogee spillway.	U	5	
	d)	Discuss construction joints & contraction joints with a neat sketch	U	5	
	e)	State the ill effects of water logging. What steps are taken to prevent these ill-effects.	R	6	
	f)	State any four factors governing the choices of suitable type of cross drainage work.	U	6	
Q.6		Attempt any **FOUR**:			**16**
	a)	Fix the reservoir level FRL & TBL from following data I) Dead storage level - 110m II) Crop water requirements - 8500 m³ III) Tank losses - 1500 m³ IV) Free Board - 1.5m V) Flood lift - 1.70m VI) Assume any other data if required.	A	4	
	b)	Discuss the working of radial gates with a neat sketch.	U	5	
	c)	Explain the working of Energy Dissipators w.r.t. I) Where it is located II) What will happen if it is omitted.	A	5	
	d)	Draw a typical c/s of gravity dam showing details of different forces acting on it.	U	5	
	e)	Draw a sketch to show the section of partly filling & partly cutting canal.	U	6	
	f)	State under what situations each of following is constructed.. i)Level crossing ii) Aqueduct iii) Syphon Aqueduct iv) Inlet & outlet	A	6	

Table within Q.6 a):

Control RL	100 (110)	112	114	116	118	120
Capacity	1000	2900	5000	6000	9000	12000

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER- 2023

EXAM. SEAT NO.

LEVEL :- FIFTH   PROGRAM : Civil Engineering

COURSE CODE :- CEG506/CEF507

COURSE NAME :- Irrigation Engineering.

MAX. MARKS : 80   TIME : 03 Hrs   DATE :- 05/12/ 23

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

Q.N	SQN	SECTION -I	R/U/A	CO	Marks
Q.1		Attempt any **FOUR**:			08
	a)	Define- i) Rainfall ii) Runoff	R	CEG506-1	
	b)	State the difference between Gross Command Area and Culturable Command Area.	U	CEG506-1	
	c)	Define- i) Base Period ii) Crop Period	R	CEG506-2	
	d)	State the relation between duty and delta for a given base period.	U	CEG506-2	
	e)	Enlist the different types of Bhandharas.	A	CEG506-3	
	f)	What do you mean by percolation tank?	R	CEG506-3	
Q.2		Attempt any **FOUR**:			16
	a)	Enlist types of Rain gauges. Explain any one with neat sketch.	R	CEG506-1	
	b)	State and describe factors affecting Run off from catchment area.	U	CEG506-1	
	c)	Sugarcane requires 75 cm in Kharif, 105 cm in Rabi and 125 cm in H.W. season. Calculate field duty in each season and mean annual duty.	A	CEG506-2	
	d)	State the factors affecting duty.	U	CEG506-2	
	e)	Enlist the factors affecting the selection of the site for Bandhara.	R	CEG506-3	
	f)	Draw the neat sketch of percolation tank	A	CEG506-3	
Q.3		Attempt any **FOUR**:			16
	a)	Explain how percolation tank differs from irrigation tank.	R	CEG506-3	
	b)	Explain Fan shaped catchment and Fern shaped catchment with neat sketch.	U	CEG506-1	
	c)	Compare the duties of the following irrigation systems and state, which one is more economical.	A	CEG506-2	
	d)	Describe sprinkler irrigation and drip irrigation methods.	U	CEG506-3	
	e)	Draw a layout of Bandhara irrigation scheme showing the catchment area, irrigation canal and other component parts.	R	CEG506-3	
	f)	What is Lift Irrigation? Enlist the component parts of lift irrigation.	U	CEG506-3	

For Q.3 c):

Data	First system	Second system
Commanded area	3000 ha	700 ha
Intensity of irrigation	40 %	60 %
Base Period	130 days	125 days
Discharge	4 cumecs	1.0 cumecs

P.T.O.

LEVEL : - **THIRD**   PROGRAM : CIVIL ENGINEERING
COURSE CODE :- **CEG305/CEF305**
COURSE NAME **SOIL MECHANICS AND FOUNDATION ENGINEERING**
MAX. MARKS : 80   TIME : **03Hrs.**   DATE :- **06/ 12 / 2023**

Instruction :-

1) Answers must be written in the main answer book provided.(and supplements if required)
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	SQN	Question Text	R/U/A	Co CEG 305	Marks
Q.1		Attempt any **FOUR:**			08
	a)	Define i) Degree of saturation ii) Specific gravity	R	1	
	b)	The porosity of soil sample is 27% and specific gravity of solids is 2.7. calculate i) Voids ratio ii) Dry density.	R	1	
	c)	Explain two advantages of flow net.	R	2	
	d)	Calculate the coefficient of uniformity and coefficient of curvature for soil sample which D10 = 0.43mm, D30 = 0.790mm, D60=1.30mm.	R	1	
	e)	State Darcy Law.	R	2	
	f)	Define compaction of soil.	R	3	
Q.2		Attempt any **FOUR:**			16
	a)	An undisturbed soil sample has volume 100 cm^3. Its weight is 190gms. After drying in oven weight reduces to 160gms. If specific gravity is 2.68. Find i) Water content ii) Void ratio iii) Porosity iv) Degree of saturation.	A	1	
	b)	Explain soil as a three phase system.	U	1	
	c)	Explain field application of soil mechanics.	U	1	
	d)	Explain any four factors affecting compaction of soil.	U	2	
	e)	A soil sample 10cm in diameter and 15cm long was tested in falling head permeabieter, initial head was 900mm and it dropped to 250mm in 25 minutes, diameter of pipe is 19mm. Find coefficient of permeability.	R	2	
	f)	Explain any four factors affecting shear strength of soil.	U	3	
Q.3		Attempt any **FOUR:**			16
	a)	Explain Mechanical sieve analysis of soil.	A	1	
	b)	A soil has void ratio = 0.72, moisture content = 12% and G=2.72. Determine its i) Dry unit weight ii) Moist unit weight.	A	1	
	c)	For saturated soil, W=40%, G= 2.71. Determine saturated and dry unit weight.	R	1	
	d)	Explain with neat sketch. How to determine coefficient of permeability by falling variable Head method.	U	2	
	e)	State the advantages and disadvantages of direct shear test.	U	1	
	f)	Explain filed methods of compaction.	U	3	

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER- 2023

EXAM SEAT NO.

LEVEL : - III   PROGRAM : CIVIL ENGINEERING
COURSE CODE :- CEG 305
COURSE NAME :- SOLI MECHANICS AND FOUNDATION ENGINEERING
MAX. MARKS : 80   TIME : 03 Hrs   DATE :- 06/12/23

QN	SQN		R/U/A	Co	Marks
Q.4		Attempt any **FOUR:**			08
	a)	State any four objectives to carry soil investigations.	U	4	
	b)	Define active pressure and passive pressure.	R	4	
	c)	Define safe bearing capacity and ultimate bearing capacity.	R	5	
	d)	Enlist laboratory methods to determine bearing capacity of soil	R	5	
	e)	Enlist any four soil support methods while foundation construction.	R	6	
	f)	Enlist any four ~~soil support methods while foundation construction.~~ Two Booring soil explorations.	R	6	
Q.5		Attempt any **FOUR:**			16
	a)	Enlist any four methods of soil investigations by Boring method and explain any one	U	4	
	b)	State criteria for deciding the location and number of test pit and bore holes as per is 1892-979	R	4	
	c)	State presumptive bearing values of following type of soil i)Black cotton soil ii) Hard rock iii) soft rock iv) sandy soil	R	5	
	d)	Explain plate load test with respect to following points i) Why this test to carry ii) Test equipment required iii) test procedure iv) A neat diagram of test set up	R	5	
	e)	Explain effect of water table on bearing capacity of soil when water table is above foundation base.	U	5	
	f)	Explain geophysical electrical resistivity method of soil investigations	U	4	
Q.6		Attempt any **FOUR:**			16
	a)	Explain permissible settlement of foundation	U	5	
	b)	Two clay A and B would experience larger settlement under identical loads and state why?	A	5	
	c)	Explain any two methods of de watering while foundation construction.	U	6	
	d)	Explain effect of sea water on foundation and protection from it.	U	6	
	e)	State use of Diaphragm wall with a neat diagram	U	6	
	f)	Enlist any four measures taken for vibration isolation.	R	6	

For Q.6 b) table:

Atterbergs limit	Clay A	Clay B
Liquid limit	44 %	55%
Plastic limit	29 %	35%
Water content	30 %	50%

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LEVEL :- **THIRD**   PROGRAM : **CIVIL ENGINEERING**
COURSE CODE :- CEG305/CEF305
COURSE NAME SOIL MECHANICS AND FOUNDATION ENGINEERING
MAX. MARKS : 80   TIME : **03Hrs.**   DATE :- 06/ 12 / 2023

Instruction :-

1) Answers must be written in the main answer book provided.(and supplements if required)
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	SQN	Question Text	R/U/A	Co CEG 305	Marks
Q.1		Attempt any **FOUR**:			08
	a)	Define i) Degree of saturation ii) Specific gravity	R	1	
	b)	The porosity of soil sample is 27% and specific gravity of solids is 2.7. calculate i) Voids ratio ii) Dry density.	R	1	
	c)	Explain two advantages of flow net.	R	2	
	d)	Calculate the coefficient of uniformity and coefficient of curvature for soil sample which D10 = 0.43mm, D30 = 0.790mm, D60=1.30mm.	R	1	
	e)	State Darcy Law.	R	2	
	f)	Define compaction of soil.	R	3	
Q.2		Attempt any **FOUR**:			16
	a)	An undisturbed soil sample has volume 100 cm^3. Its weight is 190gms. After drying in oven weight reduces to 160gms. If specific gravity is 2.68. Find i) Water content ii) Void ratio iii) Porosity iv) Degree of saturation.	A	1	
	b)	Explain soil as a three phase system.	U	1	
	c)	Explain field application of soil mechanics.	U	1	
	d)	Explain any four factors affecting compaction of soil.	U	2	
	e)	A soil sample 10cm in diameter and 15cm long was tested in falling head permeabieter, initial head was 900mm and it dropped to 250mm in 25 minutes, diameter of pipe is 19mm. Find coefficient of permeability.	R	2	
	f)	Explain any four factors affecting shear strength of soil.	U	3	
Q.3		Attempt any **FOUR**:			16
	a)	Explain Mechanical sieve analysis of soil.	A	1	
	b)	A soil has void ratio = 0.72, moisture content = 12% and G=2.72. Determine its i) Dry unit weight ii) Moist unit weight.	A	1	
	c)	For saturated soil, W=40%, G= 2.71. Determine saturated and dry unit weight.	R	1	
	d)	Explain with neat sketch. How to determine coefficient of permeability by falling variable Head method.	U	2	
	e)	State the advantages and disadvantages of direct shear test.	U	1	
	f)	Explain filed methods of compaction.	U	3	

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER- 2023

EXAM SEAT NO.

LEVEL : - III   PROGRAM : CIVIL ENGINEERING
COURSE CODE :- CEG 305
COURSE NAME :- SOLI MECHANICS AND FOUNDATION ENGINEERING
MAX. MARKS : 80   TIME : 03 Hrs   DATE :- 06/12/23

QN	SQN		R/U/A	Co	Marks
Q.4		Attempt any **FOUR**:			08
	a)	State any four objectives to carry soil investigations.	U	4	
	b)	Define active pressure and passive pressure.	R	4	
	c)	Define safe bearing capacity and ultimate bearing capacity.	R	5	
	d)	Enlist laboratory methods to determine bearing capacity of soil	R	5	
	e)	Enlist any four soil support methods while foundation construction.	R	6	
	f)	Enlist any four soil support methods while foundation construction. two Boring soil explorations.	R	6	
Q.5		Attempt any **FOUR**:			16
	a)	Enlist any four methods of soil investigations by Boring method and explain any one	U	4	
	b)	State criteria for deciding the location and number of test pit and bore holes as per is 1892-979	R	4	
	c)	State presumptive bearing values of following type of soil i)Black cotton soil ii) Hard rock iii) soft rock iv) sandy soil	R	5	
	d)	Explain plate load test with respect to following points i) Why this test to carry ii) Test equipment required iii) test procedure iv) A neat diagram of test set up	R	5	
	e)	Explain effect of water table on bearing capacity of soil when water table is above foundation base.	U	5	
	f)	Explain geophysical electrical resistivity method of soil investigations	U	4	
Q.6		Attempt any **FOUR**:			16
	a)	Explain permissible settlement of foundation	U	5	
	b)	Two clay A and B would experience larger settlement under identical loads and state why?	A	5	
	c)	Explain any two methods of de watering while foundation construction.	U	6	
	d)	Explain effect of sea water on foundation and protection from it.	U	6	
	e)	State use of Diaphragm wall with a neat diagram	U	6	
	f)	Enlist any four measures taken for vibration isolation.	R	6	

Atterbergs limit	Clay A	Clay B
Liquid limit	44 %	55%
Plastic limit	29 %	35%
Water content	30 %	50%

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LEVEL :- **THIRD**   PROGRAM : CIVIL ENGINEERING
COURSE CODE :- **CEG309/CEF309**
COURSE NAME SURVEYING-II
MAX. MARKS : 80   TIME : 03Hrs.   DATE :- 06/ 12 / 2023

Instruction :-

1) Answers must be written in the main answer book provided.(and supplements if required)
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	SQN	Question Text	R/U/A	Co CEG 309	Marks
Q.1		Attempt any **FOUR**:			08
	a)	What is a transit?	R	1	
	b)	Define the term i) Axis of Telescope ii) Face Right.	U	1	
	c)	State Bowditch Rule.	U	1	
	d)	Define i) Latitude ii) Departure.	R	1	
	e)	State any two objects of Tachometry.	R	2	
	f)	What is analytic lens?	U	2	
Q.2		Attempt any **FOUR**:			16
	a)	State and explain the procedure of measuring Bearing of a line.	U	1	
	b)	The co-ordinates of A & C are as below	A	2	

b) table:

Point	North co-ordinate	East Co-ordinate
A	600.00	550.00
C	1500.00	1150.00

Find the length and bearing of AC.

QN	SQN	Question Text	R/U/A	Co CEG 309	Marks
	c)	Describe the procedure of measuring deflection angle with Theodolite.	U	1	
	d)	Determine the length and bearing of a line EA	A	1	

d) table:

Line	Length (m)	While circle bearing
AB	458.00	$198^0 30'$
BC	265.50	$282^0 15'$
CD	160.00	$320^0 15'$
DE	398.50	$35^0 45'$
EA	?	?

QN	SQN	Question Text	R/U/A	Co CEG 309	Marks
	e)	State any four essential characteristics of a tacheometer	U	2	
	f)	Describe the procedure to find out Tacheometric constant.	U	2	

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Q.3		Attempt any **TWO**:			16
	a)	i) State and explain procedure of measuring horizontal angle by repetition method. ii) The following angles were measured in running closed traverse ABCDEA	A	1	

Station	A	B	C	D	D
Angle	$87^0 50'20''$	$114^0 50'20''$	$94^0 38'50''$	$129^0 40'40''$	$112^0 54'30''$

If the bearing of line AB=$221^0 18' 40''$. Calculate the bearings of remaining lines.

	b)	i) Explain in brief temporary adjustment of transit Theodolite.	R	1	
		ii) The following latitudes and departures were observed while running a closed traverse. Find out the independent co-ordinates of the points of the traverse.	A	1	

Line	N	S	E	W
AB	-	182.83	313.12	-
BC	144.72	-	470.12	-
CD	495.17	-	-	381.34
DE	-	268.99	-	388.46
EA	-	268.27	-	13.44

	c)	A tacheometer was fitted with anallatic lens and the following readings were observed on vertically held staff.	A	2	

Inst. Stn.	Staff stn	Vertical angle	Stadi readings
A	BM	$+7^0 00'$	0.900,1.160,1.420
A	B	$-3^0 30'$	1.140,1.235,1.330

The constant of the tacheometer was 100. Find the horizontal distance from BM to Stn. B and R.L. of B. Take RL BM as 200.00m.

Q.4		Attempt any **FOUR**:			08
	a)	Define orientation.	R	3	
	b)	Enlist the methods of plane table survey.	R	3	
	c)	State any two methods of curve setting.	R	4	
	d)	State the necessity of curves.	R	4	
	e)	Enlist any four modern surveying instruments.	R	5	
	f)	Enlist and define the types of remote sensing.	R	6	

Q.5		Attempt any **FOUR**:			16
	a)	Explain temporary adjustments of plane table.	R	3	
	b)	Explain procedure of traversing by plane table.	U	3	
	c)	Explain advantages and disadvantages of plane table survey (any four each).	U	3	
	d)	Write the accessories used in plane table survey with diagram and function.	U	3	
	e)	Draw a neat sketch of simple circular curve and write notations used in it.	U	4	
	f)	Calculate the ordinates at every 12m interval to set out a simple circular curve having long chord of 120 m and radius of 200m.	A	4	

Q.6		Attempt any **FOUR**:			16
	a)	Differentiate between compound curve and reverse curve.	U	4	
	b)	State any eight uses of total station.	R	5	
	c)	Explain the procedure of measurement of horizontal angle using digital Theodolite.	U	5	
	d)	Explain procedure of finding reduced levels using digital level.	U	5	
	e)	State the procedure of remote sensing in detail.	U	6	
	f)	Write a note on GPS system.	U	6	

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

ODD TERM END EXAM WINTER -2023

EXAM SEAT NO.

LEVEL : - **THIRD**   PROGRAM : **CIVIL ENGINEERING**
COURSE CODE :- **CEG309/CEF309**
COURSE NAME   **SURVEYING-II**
MAX. MARKS : **80**   TIME : **03Hrs.**   DATE :- **06/ 12 / 2023**

Instruction :-

1) Answers must be written in the main answer book provided.(and supplements if required)
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	SQN	Question Text	R/U/A	Co CEG 309	Marks
Q.1		Attempt any **FOUR**:			08
	a)	What is a transit?	R	1	
	b)	Define the term i) Axis of Telescope ii) Face Right.	U	1	
	c)	State Bowditch Rule.	U	1	
	d)	Define i) Latitude ii) Departure.	R	1	
	e)	State any two objects of Tachometry.	R	2	
	f)	What is analytic lens?	U	2	
Q.2		Attempt any **FOUR**:			16
	a)	State and explain the procedure of measuring Bearing of a line.	U	1	
	b)	The co-ordinates of A & C are as below	A	2	
	c)	Describe the procedure of measuring deflection angle with Theodolite.	U	1	
	d)	Determine the length and bearing of a line EA	A	1	
	e)	State any four essential characteristics of a tacheometer	U	2	
	f)	Describe the procedure to find out Tacheometric constant.	U	2	

Q.2 b)

Point	North co-ordinate	East Co-ordinate
A	600.00	550.00
C	1500.00	1150.00

Find the length and bearing of AC.

Q.2 d)

Line	Length (m)	While circle bearing
AB	458.00	$198^0 30'$
BC	265.50	$282^0 15'$
CD	160.00	$320^0 15'$
DE	398.50	$35^0 45'$
EA	?	?

1/8

P.T.O

Q.3		Attempt any **TWO:**			16
	a)	i) State and explain procedure of measuring horizontal angle by repetition method. ii) The following angles were measured in running closed traverse ABCDEA	A	1	

Station	A	B	C	D	D
Angle	$87^0 50'20''$	$114^0 50'20''$	$94^0 38'50''$	$129^0 40'40''$	$112^0 54'30''$

		If the bearing of line AB=$221^0 18' 40''$. Calculate the bearings of remaining lines.			
	b)	i) Explain in brief temporary adjustment of transit Theodolite. ii) The following latitudes and departures were observed while running a closed traverse. Find out the independent co-ordinates of the points of the traverse.	R A	1 1	

Line	N	S	E	W
AB	-	182.83	313.12	-
BC	144.72	-	470.12	-
CD	495.17	-	-	381.34
DE	-	268.99	-	388.46
EA	-	268.27	-	13.44

	c)	A tacheometer was fitted with anallatic lens and the following readings were observed on vertically held staff.	A	2	

Inst. Stn.	Staff stn	Vertical angle	Stadi readings
A	BM	$+7^0 00'$	0.900,1.160,1.420
A	B	$-3^0 30'$	1.140,1.235,1.330

		The constant of the tacheometer was 100. Find the horizontal distance from BM to Stn. B and R.L. of B. Take RL of BM as 200.00m.			

Q.4		Attempt any **FOUR:**			08
	a)	Define orientation.	R	3	
	b)	Enlist the methods of plane table survey.	R	3	
	c)	State any two methods of curve setting.	R	4	
	d)	State the necessity of curves.	R	4	
	e)	Enlist any four modern surveying instruments.	R	5	
	f)	Enlist and define the types of remote sensing.	R	6	

Q.5		Attempt any **FOUR:**			16
	a)	Explain temporary adjustments of plane table.	R	3	
	b)	Explain procedure of traversing by plane table.	U	3	
	c)	Explain advantages and disadvantages of plane table survey (any four each).	U	3	
	d)	Write the accessories used in plane table survey with diagram and function.	U	3	
	e)	Draw a neat sketch of simple circular curve and write notations used in it.	U	4	
	f)	Calculate the ordinates at every 12m interval to set out a simple circular curve having long chord of 120 m and radius of 200m.	A	4	

Q.6		Attempt any **FOUR**:			16
	a)	Differentiate between compound curve and reverse curve.	U	4	
	b)	State any eight uses of total station.	R	5	
	c)	Explain the procedure of measurement of horizontal angle using digital Theodolite.	U	5	
	d)	Explain procedure of finding reduced levels using digital level.	U	5	
	e)	State the procedure of remote sensing in detail.	U	6	
	f)	Write a note on GPS system.	U	6	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER- 2023

EXAM. SEAT NO.

LEVEL : - FIFTH   PROGRAM : CIVIL ENGINEERING
COURSE CODE :- CEG505
COURSE NAME :- ENVIRONMENTAL ENGINEERING
MAX. MARKS : 80   TIME : **03 Hrs**   DATE :- 07/12/23

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No.. SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

Q.N	SQN	SECTION -I	R/U/A	CO	Marks
Q.1		Attempt any **FOUR**:			08
	a)	Enlist any four types of Intake structures provided, depending upon the type of source of water.	R	CEG505-1	
	b)	Define – i) Per capita demand (ii) Design Period	R	CEG505-1	
	c)	Enlist the Physical tests to be conducted on water to check its quality.	R	CEG505-1	
	d)	List various forms of Chlorination	R	CEG505-2	
	e)	List different types of valves which are provided on the pipes of distribution system of water	R	CEG505-3	
	f)	Why and where 'Air Valve' is located ?	R	CEG505-3	
Q.2		Attempt any **FOUR**:			16
	a)	Describe about the intake structure constructed upstream of dam with neat labeled sketch.	U	CEG505-1	
	b)	Explain about various types of variation of demand of water	U	CEG505-1	
	c)	Draw a flow diagram of water supply scheme from the source of water to the consumer	U	CEG505-1	
	d)	Explain in brief the working process of rapid sand filter.	U	CEG505-2	
	e)	Differentiate between rapid sand filter and slow sand filter with reference to - i) Rate of filtration ii) Flexibility in operation iii) Period of cleaning iv) Economy	U	CEG505-2	
	f)	Explain the Jar Test to determine approximate dose of coagulant with the help of neat labeled sketch.	U	CEG505-2	
Q.3		Attempt any **FOUR**:			16
	a)	Enlist types of pipes used in distribution system of water to the public. State the factors affecting selection of pipe material.	A	CEG505-3	
	b)	List the methods of forecasting of population and explain in brief about any one	U	CEG505-1	
	c)	State the precautions to be taken during the collection of water sample for analysis purpose.	U	CEG505-1	
	d)	Enlist different methods of Aeration. Explain anyone of them with neat sketch.	A	CEG505-2	
	e)	Describe the principle behind sedimentation with coagulation and explain the process	U	CEG505-2	
	f)	Enlist different methods of distribution of water depending on location of the source of water. Explain any one in detail.	U	CEG505-3	

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER / WINTER

EXAM SEAT NO.

LEVEL : - V   PROGRAM : CIVIL ENGINEERING
COURSE CODE :- CEG505
COURSE NAME :- ENVIRONMENTAL ENGINEERING
MAX. MARKS : 80   TIME : 03 Hrs   DATE :-07/12/23

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.

QN	SQN	SECTION –II	R/U/A	Co	Marks
Q.4		Attempt any **FOUR:**			08
	a)	Define Garbage	R	CEG-505-4	
	b)	State the location of Intercepting trap	R	CEG-505-4	
	c)	What is dry weather flow	R	CEG-505-5	
	d)	What do you mean by Non scouring velocity	R	CEG-505-5	
	e)	Define C. O. D.	R	CEG-505-6	
	f)	Explain in brief anaerobic decomposition of sewage	R	CEG-505-6	
Q.5		Attempt any **FOUR:**			16
	a)	Draw labeled sketch of Inspection chamber and give the purpose of providing Inspection chambers	A	CEG-505-4	
	b)	Distinguish between one pipe system and two pipe system of plumbing	U	CEG-505-4	
	c)	Sketch flushing cistern and Indian type water closet pan	U	CEG-505-4	
	d)	What is street inlet? Explain types of street inlets	U	CEG-505-5	
	e)	Explain methods of carrying refuse in detail	A	CEG-505-5	
	f)	Draw the flow diagram of sewage treatment plant for town	A	CEG-505-6	
Q.6		Attempt any **FOUR:**			16
	a)	Explain testing of house drainage system	A	CEG-505-4	
	b)	What are the principles of house drainage	U	CEG-505-4	
	c)	Explain with sketch septic tank	U	CEG-505-5	
	d)	Distinguish between oxidation pond and oxidation ditch	U	CEG-505-6	
	e)	Give norms of Maharashtra pollution control board for the discharge of treated sewage	A	CEG-505-6	
	f)	What is B.O.D., Give its significance	A	CEG-505-6	

LEVEL :- FIFTH   PROGRAM : CIVIL ENGINEERING
COURSE CODE :- CEG505
COURSE NAME :- ENVIRONMENTAL ENGINEERING
MAX. MARKS : 80   TIME : **03 Hrs**   DATE :- 07/12/23

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

Q.N	SQN	SECTION -I	R/U/A	CO	Marks
Q.1		Attempt any **FOUR**:			08
	a)	Enlist any four types of Intake structures provided, depending upon the type of source of water.	R	CEG505-1	
	b)	Define – i) Per capita demand (ii) Design Period	R	CEG505-1	
	c)	Enlist the Physical tests to be conducted on water to check its quality.	R	CEG505-1	
	d)	List various forms of Chlorination	R	CEG505-2	
	e)	List different types of valves which are provided on the pipes of distribution system of water	R	CEG505-3	
	f)	Why and where 'Air Valve' is located ?	R	CEG505-3	
Q.2		Attempt any **FOUR**:			16
	a)	Describe about the intake structure constructed upstream of dam with neat labeled sketch.	U	CEG505-1	
	b)	Explain about various types of variation of demand of water	U	CEG505-1	
	c)	Draw a flow diagram of water supply scheme from the source of water to the consumer	U	CEG505-1	
	d)	Explain in brief the working process of rapid sand filter.	U	CEG505-2	
	e)	Differentiate between rapid sand filter and slow sand filter with reference to - i) Rate of filtration ii) Flexibility in operation iii) Period of cleaning iv) Economy	U	CEG505-2	
	f)	Explain the Jar Test to determine approximate dose of coagulant with the help of neat labeled sketch.	U	CEG505-2	
Q.3		Attempt any **FOUR**:			16
	a)	Enlist types of pipes used in distribution system of water to the public. State the factors affecting selection of pipe material.	A	CEG505-3	
	b)	List the methods of forecasting of population and explain in brief about any one	U	CEG505-1	
	c)	State the precautions to be taken during the collection of water sample for analysis purpose.	U	CEG505-1	
	d)	Enlist different methods of Aeration. Explain anyone of them with neat sketch.	A	CEG505-2	
	e)	Describe the principle behind sedimentation with coagulation and explain the process	U	CEG505-2	
	f)	Enlist different methods of distribution of water depending on location of the source of water. Explain any one in detail.	U	CEG505-3	

P.T.O.

LEVEL :- V   PROGRAM : CIVIL ENGINEERING
COURSE CODE :- CEG505
COURSE NAME :- ENVIRONMENTAL ENGINEERING
MAX. MARKS : 80   TIME : 03 Hrs   DATE :- 07/12/23

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.

QN	SQN	SECTION –II	R/U/A	Co	Marks
Q.4		Attempt any **FOUR:**			08
	a)	Define Garbage	R	CEG-505-4	
	b)	State the location of Intercepting trap	R	CEG-505-4	
	c)	What is dry weather flow	R	CEG-505-5	
	d)	What do you mean by Non scouring velocity	R	CEG-505-5	
	e)	Define C. O. D.	R	CEG-505-6	
	f)	Explain in brief anaerobic decomposition of sewage	R	CEG-505-6	
Q.5		Attempt any **FOUR:**			16
	a)	Draw labeled sketch of Inspection chamber and give the purpose of providing Inspection chambers	A	CEG-505-4	
	b)	Distinguish between one pipe system and two pipe system of plumbing	U	CEG-505-4	
	c)	Sketch flushing cistern and Indian type water closet pan	U	CEG-505-4	
	d)	What is street inlet? Explain types of street inlets	U	CEG-505-5	
	e)	Explain methods of carrying refuse in detail	A	CEG-505-5	
	f)	Draw the flow diagram of sewage treatment plant for town	A	CEG-505-6	
Q.6		Attempt any **FOUR:**			16
	a)	Explain testing of house drainage system	A	CEG-505-4	
	b)	What are the principles of house drainage	U	CEG-505-4	
	c)	Explain with sketch septic tank	U	CEG-505-5	
	d)	Distinguish between oxidation pond and oxidation ditch	U	CEG-505-6	
	e)	Give norms of Maharashtra pollution control board for the discharge of treated sewage	A	CEG-505-6	
	f)	What is B.O.D., Give its significance	A	CEG-505-6	

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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WINTER/SUMMER- 2023

EXAM SEAT NO.

LEVEL: - V   PROGRAM: Civil Engineering

COURSE CODE: - CEG 509/CEF510

COURSE NAME: - Solid Waste Management

MAX. MARKS: 80   TIME: 03 Hrs   DATE:- 07/12/23

Instruction: -

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	SQN	SECTION -I	R/U/A	Co CEG 509	Marks
Q.1		Attempt any **FOUR**:			08
	a)	Enlist transportation vehicles used for solid waste management.	R	2	
	b)	Enlist any four sources of solid waste.	U	1	
	c)	State the types of hospital waste.	R	3	
	d)	Write any two physical characteristics of solid waste.	A	1	
	e)	Describe in brief importance of segregation at source.	U	2	
	f)	Define Solid waste	R	1	
Q.2		Attempt any **FOUR**:			16
	a)	Discuss, the health problems arise during handling and disposal of hazardous waste	R	3	
	b)	Enlist types of collection system of waste and explain any one.	U	2	
	c)	Write the purpose with neat sketch of the following i) Broom ii) Shovels	A	3	
	d)	Explain solid waste management hierarchy with neat sketch.	U	1	
	e)	Enlist purpose and benefits of recycling of waste.	R	2	
	f)	Explain precautions taken while transporting of biomedical waste.	U	3	
Q.3		Attempt any **FOUR**:			16
	a)	State the necessity of transfer station and any four factors to be considered for locating it.	A	2	
	b)	Explain Sources of generation of Biomedical waste.	U	3	
	c)	Draw Organization pattern of solid waste management	A	2	
	d)	Classify colour coding for different types of hospital wastes.	A	3	
	e)	Describe chemical characteristics of solid wastes.	R	1	
	f)	Enlist methods of disposal of hospital waste and explain any one.	U	3	

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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WINTER/SUMMER- 2023

EXAM SEAT NO.

LEVEL :- V PROGRAM : Civil Engineering
COURSE CODE :- CEG 509 / CEF 510
COURSE NAME :- Solid Waste Management
MAX. MARKS : 80 TIME : **03 Hrs** DATE :- 07/12/23

QN	SQN	SECTION –II	R/U/A	Co CEG 509	Marks
Q.4		Attempt any **FOUR**:			08
	a)	Define leachate	R	4	
	b)	Write in brief applicability of MSW management rules 2016	R	6	
	c)	Explain in brief necessity of Incineration	U	5	
	d)	State Principle of composting	R	4	
	e)	Define 'Refused Derived Fuel'	R	6	
	f)	State any two varieties of E-waste	R	5	
Q.5		Attempt any **FOUR**:			16
	a)	State the concept of pyrolysis and mention difference with Incineration	A	5	
	b)	Enlist factors governing the composting process and explain any one in detail	U	4	
	c)	State the responsibility of Industry in disposal of Industrial waste	A	5	
	d)	Write any eight factors considered for sanitary landfill site selection	A	4	
	e)	Explain responsibility of local bodies as per plastic waste management rules 2016	U	6	
	f)	Explain advantages of composting	U	4	
Q.6		Attempt any **FOUR**:			16
	a)	Write advantages and disadvantages of Incineration	A	5	
	b)	Enlist types of landfill and explain trench method of landfilling with neat sketch	A	4	
	c)	Mention any four Salient features of Construction and Demolition Waste Management Rules,2016	A	6	
	d)	Explain with neat sketch Multiple chamber Incinerator	R	5	
	e)	Write step wise process of Bangalore method of composting	U	4	
	f)	Explain the problems of disposal of industrial waste	U	5	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.
(An Autonomous Institute of Govt. Of Maharashtra)
WINTER/SUMMER- 2023
EXAM SEAT NO.

LEVEL: - V   PROGRAM: Civil Engineering
COURSE CODE: -   CEG 509/CEF510
COURSE NAME: - Solid Waste Management
MAX. MARKS: 80   TIME: 03 Hrs   DATE:-67/12/23

Instruction: -

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	SQN	SECTION -I	R/U/A	Co CEG 509	Marks
Q.1		Attempt any **FOUR**:			08
	a)	Enlist transportation vehicles used for solid waste management.	R	2	
	b)	Enlist any four sources of solid waste.	U	1	
	c)	State the types of hospital waste.	R	3	
	d)	Write any two physical characteristics of solid waste.	A	1	
	e)	Describe in brief importance of segregation at source.	U	2	
	f)	Define Solid waste	R	1	
Q.2		Attempt any **FOUR**:			16
	a)	Discuss, the health problems arise during handling and disposal of hazardous waste	R	3	
	b)	Enlist types of collection system of waste and explain any one.	U	2	
	c)	Write the purpose with neat sketch of the following i) Broom ii) Shovels	A	3	
	d)	Explain solid waste management hierarchy with neat sketch.	U	1	
	e)	Enlist purpose and benefits of recycling of waste.	R	2	
	f)	Explain precautions taken while transporting of biomedical waste.	U	3	
Q.3		Attempt any **FOUR**:			16
	a)	State the necessity of transfer station and any four factors to be considered for locating it.	A	2	
	b)	Explain Sources of generation of Biomedical waste.	U	3	
	c)	Draw Organization pattern of solid waste management	A	2	
	d)	Classify colour coding for different types of hospital wastes.	A	3	
	e)	Describe chemical characteristics of solid wastes.	R	1	
	f)	Enlist methods of disposal of hospital waste and explain any one.	U	3	

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER- 2023

EXAM SEAT NO.

LEVEL : - V   PROGRAM : Civil Engineering
COURSE CODE :- CEG 509 / CEF510
COURSE NAME :- Solid Waste Management
MAX. MARKS : 80   TIME : 03 Hrs   DATE :-07/12/23

QN	SQN	SECTION –II	R/U/A	Co CEG 509	Marks
Q.4		Attempt any **FOUR**:			**08**
	a)	Define leachate	R	4	
	b)	Write in brief applicability of MSW management rules 2016	R	6	
	c)	Explain in brief necessity of Incineration	U	5	
	d)	State Principle of composting	R	4	
	e)	Define 'Refused Derived Fuel'	R	6	
	f)	State any two varieties of E-waste	R	5	
Q.5		Attempt any **FOUR**:			**16**
	a)	State the concept of pyrolysis and mention difference with Incineration	A	5	
	b)	Enlist factors governing the composting process and explain any one in detail	U	4	
	c)	State the responsibility of Industry in disposal of Industrial waste	A	5	
	d)	Write any eight factors considered for sanitary landfill site selection	A	4	
	e)	Explain responsibility of local bodies as per plastic waste management rules 2016	U	6	
	f)	Explain advantages of composting	U	4	
Q.6		Attempt any **FOUR**:			**16**
	a)	Write advantages and disadvantages of Incineration	A	5	
	b)	Enlist types of landfill and explain trench method of landfilling with neat sketch	A	4	
	c)	Mention any four Salient features of Construction and Demolition Waste Management Rules,2016	A	6	
	d)	Explain with neat sketch Multiple chamber Incinerator	R	5	
	e)	Write step wise process of Bangalore method of composting	U	4	
	f)	Explain the problems of disposal of industrial waste	U	5	

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LEVEL : - **THIRD**   PROGRAM : **CIVIL ENGINEERING**
COURSE CODE :- **CEG302**
COURSE NAME   **BUILDING CONSTRUCTION**
MAX. MARKS : 80   TIME : 03Hrs.   DATE :- 08/ 12 / 2023

Instruction :-

1) Answers must be written in the main answer book provided.(and supplements if required)
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	SQN	Question Text	R/U/A	Co CEG 302	Marks
Q.1		Attempt any **FOUR**:			08
	a)	What is the function of columns?	R	1	
	b)	Differentiate between framed structure and load bearing.	R	1	
	c)	State any four timber based materials available in market.	A	1	
	d)	What is Scaffolding?	R	2	
	e)	Define the term job layout	U	2	
	f)	Draw and name components of door frame.	R	3	
Q.2		Attempt any **FOUR**:			16
	a)	Explain the procedure of transferring layout plan for framed structure on ground by center line method.	A	2	
	b)	State any eight requirements of good building stone.	U	1	
	c)	State any four precautions are to be taken while constructing foundation in black cotton soil.	U	2	
	d)	Draw the plans for alternate courses of 1½brick thick wall in Flemish Bond.	U	2	
	e)	Enlist and explain component parts of scaffolding.	U	2	
	f)	Draw neat sketch of six paneled double leafed door showing all the component parts.	A	3	
Q.3		Attempt any **FOUR**:			16
	a)	Suggest type of foundation for construction of heavy loaded building in marshy land having soft strata. Explain suggested foundation with a neat sketch.	U	1	
	b)	Suggest type of scaffolding for constructing stone masonry wall. Explain with a neat sketch the suggested type of scaffolding.	A	2	
	c)	Explain the functions of following :- i) Doors ii) Roof iii) Wall iv) Parapet.	U	1	
	d)	Explain with neat sketch the following:- i) Stretcher bond ii) Header Bond.	R	2	
	e)	Suggest the type of timbering method for excavation for foundation for a depth of 2 to 4m. Explain the suggested type of method with a neat sketch.	A	2	
	f)	Draw the neat sketch of louvered window diagram with labeling.	R	3	

P.T.O

QN	SQN	Question Text	R/U/A	Co CEG 302	Marks
Q.4		Attempt any **FOUR:**			08
	a)	Enlist any four means of vertical communication.	R	4	
	b)	State any four requirements of good staircase.	U	4	
	c)	State the necessity of Pointing work.	U	5	
	d)	State any four factors affecting the section of flooring material.	U	5	
	e)	Write the importance waterproofing work.	A	6	
	f)	Define i) Grouting ii) Concreting.	R	6	
Q.5		Attempt any **FOUR:**			16
	a)	Draw a neat sketch of following types of staircase and write its suitability i) Bifurcated staircase ii) Spiral staircase	R	4	2 2
	b)	Explain the application process of pebble dash finish plaster.	A	5	
	c)	Explain with a neat sketch the construction procedure of tremix floor.	U	5	
	d)	Define following terms related to pitched roof i) Purlin ii) Principle rafter iii) Pitch iv) Eaves board	R	5	
	e)	Discuss with a neat sketch the construction procedure of providing waterproofing work to the open terrace.	A	6	
	f)	State any four causes of cracks in building and suggest its remedial measures.	U	6	
Q.6		Attempt any **FOUR:**			16
	a)	Draw a neat c/s of staircase showing all component parts and define any two of them	U	4	
	b)	Mention the flooring materials which you will recommend for the following structures. i) Art gallery ii) Hospital iii) Temple iv) Bathroom.	U	4	
	c)	Discuss the important points to be noted before the process of painting is started.	A	5	
	d)	Draw a neat sketch of formwork for beam and slab with its support.	U	6	
	e)	Give the formwork stripping time when ordinary Portland cement is used i) Vertical formwork to column, beams and walls. ii) Props to slab (upto 4.5m or 15 ft) iii) Props to beam (over 4.5m) iv) Soffit formwork to beams. (props to be refixed)	A	6	
	f)	Define termite proofing term and explain the method of soil treatment with termite proofing chemicals.	A	6	

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LEVEL :- **THIRD**   PROGRAM : **CIVIL ENGINEERING**
COURSE CODE :- **CEG302**
COURSE NAME   **BUILDING CONSTRUCTION**
MAX. MARKS : **80**   TIME : **03Hrs.**   DATE :-   **08/ 12 / 2023**

Instruction :-

1) Answers must be written in the main answer book provided.(and supplements if required)

2) Illustrate your answers with sketches wherever necessary.

3) Use of non-programmable pocket calculator is permissible.

4) Mathematical and other tables shall be made available on request.

5) Assume and mention suitable additional data if necessary.

6) Use of Mobile is strictly prohibited.

7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	SQN	Question Text	R/U/A	Co CEG 302	Marks
Q.1		Attempt any **FOUR**:			08
	a)	What is the function of columns?	R	1	
	b)	Differentiate between framed structure and load bearing.	R	1	
	c)	State any four timber based materials available in market.	A	1	
	d)	What is Scaffolding?	R	2	
	e)	Define the term job layout	U	2	
	f)	Draw and name components of door frame.	R	3	
Q.2		Attempt any **FOUR**:			16
	a)	Explain the procedure of transferring layout plan for framed structure on ground by center line method.	A	2	
	b)	State any eight requirements of good building stone.	U	1	
	c)	State any four precautions are to be taken while constructing foundation in black cotton soil.	U	2	
	d)	Draw the plans for alternate courses of 1½brick thick wall in Flemish Bond.	U	2	
	e)	Enlist and explain component parts of scaffolding.	U	2	
	f)	Draw neat sketch of six paneled double leafed door showing all the component parts.	A	3	
Q.3		Attempt any **FOUR**:			16
	a)	Suggest type of foundation for construction of heavy loaded building in marshy land having soft strata. Explain suggested foundation with a neat sketch.	U	1	
	b)	Suggest type of scaffolding for constructing stone masonry wall. Explain with a neat sketch the suggested type of scaffolding.	A	2	
	c)	Explain the functions of following :- i) Doors ii) Roof iii) Wall iv) Parapet.	U	1	
	d)	Explain with neat sketch the following:- i) Stretcher bond ii) Header Bond.	R	2	
	e)	Suggest the type of timbering method for excavation for foundation for a depth of 2 to 4m. Explain the suggested type of method with a neat sketch.	A	2	
	f)	Draw the neat sketch of louvered window diagram with labeling.	R	3	

QN	SQN	Question Text	R/U/A	Co CEG 302	Marks
Q.4		Attempt any **FOUR**:			08
	a)	Enlist any four means of vertical communication.	R	4	
	b)	State any four requirements of good staircase.	U	4	
	c)	State the necessity of Pointing work.	U	5	
	d)	State any four factors affecting the section of flooring material.	U	5	
	e)	Write the importance waterproofing work.	A	6	
	f)	Define i) Grouting ii) Concreting.	R	6	
Q.5		Attempt any **FOUR**:			16
	a)	Draw a neat sketch of following types of staircase and write its suitability i) Bifurcated staircase ii) Spiral staircase	R	4	2 2
	b)	Explain the application process of pebble dash finish plaster.	A	5	
	c)	Explain with a neat sketch the construction procedure of tremix floor.	U	5	
	d)	Define following terms related to pitched roof i) Purlin ii) Principle rafter iii) Pitch iv) Eaves board	R	5	
	e)	Discuss with a neat sketch the construction procedure of providing waterproofing work to the open terrace.	A	6	
	f)	State any four causes of cracks in building and suggest its remedial measures.	U	6	
Q.6		Attempt any **FOUR**:			16
	a)	Draw a neat c/s of staircase showing all component parts and define any two of them	U	4	
	b)	Mention the flooring materials which you will recommend for the following structures. i) Art gallery ii) Hospital iii) Temple iv) Bathroom.	U	4	
	c)	Discuss the important points to be noted before the process of painting is started.	A	5	
	d)	Draw a neat sketch of formwork for beam and slab with its support.	U	6	
	e)	Give the formwork stripping time when ordinary Portland cement is used i) Vertical formwork to column, beams and walls. ii) Props to slab (upto 4.5m or 15 ft) iii) Props to beam (over 4.5m) iv) Soffit formwork to beams, (props to be refixed)	A	6	
	f)	Define termite proofing term and explain the method of soil treatment with termite proofing chemicals.	A	6	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

ODD TERM END EXAM WINTER -2023

EXAM SEAT NO.

LEVEL : - THIRD   PROGRAM : CIVIL ENGINEERING
COURSE CODE :- CEG311
COURSE NAME   ADVANCED CONSTRUCTION TECHNIQUES & EQUIPMENTS
MAX. MARKS : 80   TIME : 03Hrs.   DATE :- 08/ 12 / 2023

Instruction :-

1) Answers must be written in the main answer book provided.(and supplements if required)
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	SQN	Question Text	R/U/A	Co CEG 311	Marks
Q.1		Attempt any **FOUR**:			08
	a)	Enlist any four equipments used for grouting.	R	1	
	b)	State any two advanced piling techniques.	R	2	
	c)	Write any four applications of soil nailing.	A	2	
	d)	Define Formwork and state it's any two necessities.	R	3	
	e)	State any four necessities for grouting.	R	1	
	f)	Write any four advantages of RMC.	U	2	
Q.2		Attempt any **FOUR**:			16
	a)	Draw a neat labeled sketch of Tremix method of concreting.	R	2	
	b)	Explain drilling patterns for grouting.	U	1	
	c)	Explain the concept of Soil Freezing.	U	2	
	d)	Define self Heating concrete and explain its any four advantages.	R/U	1	
	e)	Draw a neat sketch of slope stabilization in Cutting.	R	2	
	f)	State any four uses of slip formwork in high rise building.	R	3	
Q.3		Attempt any **FOUR**:			16
	a)	Explain FRC briefly and state it's any four types with its suitability.	U	1	
	b)	Explain any four uses of grouts in tunnels.	U	1	
	c)	Explain briefly any four necessities of soil reinforcing.	A	2	
	d)	State any four characteristics of HPC (high performance concrete) and write it's any four applications.	R	1	
	e)	Explain Maivan formwork, where it is used?	A	3	
	f)	Explain limitations of bridge formwork (any four)	U	3	

QN	SQN	Question Text	R/U/A	Co CEG 311	Marks
Q.4		Attempt any **FOUR**:			08
	a)	Define the term conveying.	R	4	
	b)	Write principle of carne.	U	4	
	c)	State any two advantages of sheep foot roller and suitability of sheep foot roller.	A	4	
	d)	State any two uses of concrete vibrators.	U	5	
	e)	Enlist any four components of hot mix bitumen plant.	R	5	
	f)	Compare any four points between standard and special equipments	U	6	
Q.5		Attempt any **FOUR**:			16
	a)	Draw a neat labelled sketch of Tower crane and state the principles of tower crane.	R	4	
	b)	Enlist the types of Rammers and state any four uses of Rammers.	U	4	
	c)	Draw a neat labelled sketch or layout of Automatic concrete plants.	A	5	
	d)	Enlist the Types of Stone crusher and explain in brief working of primary stone crusher.	U	5	
	e)	Discuss the process of manufacturing of artificial sand.	A	5	
	f)	State and discuss any four points to be considered for selection of equipments.	U	6	
Q.6		Attempt any **FOUR**:			16
	a)	Explain in brief working of Loader with back hoe with neat sketch.	U	4	
	b)	Draw a neat labelled sketch of sheep footed roller and explain in brief working of sheep footed roller.	A	4	
	c)	Explain the working of transit mixer with neat sketch.	U	5	
	d)	State the suitability of Derricks and Truck mounted crane.	U	4	
	e)	Discuss any four points that you will considered for equipment management.	A	6	
	f)	Explain in brief working of screed vibrators.	U	5	

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LEVEL : - **THIRD**   PROGRAM : **CIVIL ENGINEERING**
COURSE CODE :- **CEG311**
COURSE NAME   **ADVANCED CONSTRUCTION TECHNIQUES & EQUIPMENTS**
MAX. MARKS : 80   TIME : **03Hrs.**   DATE :- 08/ 12 / 2023

Instruction :-

1) Answers must be written in the main answer book provided.(and supplements if required)
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	SQN	Question Text	R/U/A	Co CEG 311	Marks
Q.1		Attempt any **FOUR:**			08
	a)	Enlist any four equipments used for grouting.	R	1	
	b)	State any two advanced piling techniques.	R	2	
	c)	Write any four applications of soil nailing.	A	2	
	d)	Define Formwork and state it's any two necessities.	R	3	
	e)	State any four necessities for grouting.	R	1	
	f)	Write any four advantages of RMC.	U	2	
Q.2		Attempt any **FOUR:**			16
	a)	Draw a neat labeled sketch of Tremix method of concreting.	R	2	
	b)	Explain drilling patterns for grouting.	U	1	
	c)	Explain the concept of Soil Freezing.	U	2	
	d)	Define self Heating concrete and explain its any four advantages.	R/U	1	
	e)	Draw a neat sketch of slope stabilization in Cutting.	R	2	
	f)	State any four uses of slip formwork in high rise building.	R	3	
Q.3		Attempt any **FOUR:**			16
	a)	Explain FRC briefly and state it's any four types with its suitability.	U	1	
	b)	Explain any four uses of grouts in tunnels.	U	1	
	c)	Explain briefly any four necessities of soil reinforcing.	A	2	
	d)	State any four characteristics of HPC (high performance concrete) and write it's any four applications.	R	1	
	e)	Explain Maivan formwork, where it is used?	A	3	
	f)	Explain limitations of bridge formwork (any four)	U	3	

QN	SQN	Question Text	R/U/A	Co CEG 311	Marks
Q.4		Attempt any **FOUR**:			08
	a)	Define the term conveying.	R	4	
	b)	Write principle of carne.	U	4	
	c)	State any two advantages of sheep foot roller and suitability of sheep foot roller.	A	4	
	d)	State any two uses of concrete vibrators.	U	5	
	e)	Enlist any four components of hot mix bitumen plant.	R	5	
	f)	Compare any four points between standard and special equipments	U	6	
Q.5		Attempt any **FOUR**:			16
	a)	Draw a neat labelled sketch of Tower crane and state the principles of tower crane.	R	4	
	b)	Enlist the types of Rammers and state any four uses of Rammers.	U	4	
	c)	Draw a neat labelled sketch or layout of Automatic concrete plants.	A	5	
	d)	Enlist the Types of Stone crusher and explain in brief working of primary stone crusher.	U	5	
	e)	Discuss the process of manufacturing of artificial sand.	A	5	
	f)	State and discuss any four points to be considered for selection of equipments.	U	6	
Q.6		Attempt any **FOUR**:			16
	a)	Explain in brief working of Loader with back hoe with neat sketch.	U	4	
	b)	Draw a neat labelled sketch of sheep footed roller and explain in brief working of sheep footed roller.	A	4	
	c)	Explain the working of transit mixer with neat sketch.	U	5	
	d)	State the suitability of Derricks and Truck mounted crane.	U	4	
	e)	Discuss any four points that you will considered for equipment management.	A	6	
	f)	Explain in brief working of screed vibrators.	U	5	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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ODD TERM END EXAM WINTER -2023

EXAM SEAT NO.

LEVEL :- **THIRD**   PROGRAM : **CIVIL ENGINEERING**
COURSE CODE :- **CEG306**
COURSE NAME   **HYDRAULICS**
MAX. MARKS : **80**   TIME : **03Hrs.**   DATE :- **11/ 12 / 2023**

Instruction :-

1) Answers must be written in the main answer book provided.(and supplements if required)
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	SQN	Question Text	R/U/A	Co CEG 306	Marks
Q.1		Attempt any **FOUR**:			08
	a)	Define viscosity and give its unit.	R	1	
	b)	Convert a pressure of 100KPa into 'm' of carbon tetrachloride of relative density 1.6.	A	1	
	c)	Define pressure and give its unit.	R	2	
	d)	Give any two applications of Pascal's Law.	U	2	
	e)	State any two applications of Reynold's number.	U	3	
	f)	List any four locations in irrigation where hydraulic principles are used.	U	1	
Q.2		Attempt any **FOUR**:			16
	a)	A 400 ml of certain liquid weight 9N. Calculate the weight density, mass density & specific gravity of liquid.	A	1	
	b)	The specific weight of liquid is $10KN/m^3$. Determine its i) Specific gravity ii) Mass density.	A	1	
	c)	When C.P. & C G. will coincide with each other.	U	2	
	d)	A circular plate 1.5m dia. is placed vertically in water so that centre of plate is 2.5m below free surface. Determine total pressure on plate and C.P. depth.	A	2	
	e)	Define absolute pressure, Gauge pressure, vacuum pressure and show the relationship.	U	2	
	f)	A pipeline gradually varies from 15cm dia. at A to 7.5cm dia. At B. Point A is 6m above the datum and point B is 3m above the datum. velocity at A is 3.6 m/sec. Determine pressure at B, if pressure of A is $9.81N/cm^2$.	A	3	
Q.3		Attempt any **FOUR**:			16
	a)	Explain with neat sketch working of Bourdon's pressure gauge.	U	1	
	b)	Atmospheric pressure is 720mm of mercury Gauge pressure measured is $22.5N/cm^2$. Determine the absolute pressure in terms of i) Meter of water ii) in KN/m^2.	U	2	
	c)	A tank contains water for a height of 0.5m and an immercible liquid of specific gravity 0.8 above the water for a height of 1m. Find the resultant pressure per meter length of tank.	A	2	

	d)	Define the following terms
		    i) Steady flow ii) Uniform flow iii) Streamline flow
		    iv) Equipotential lines.
			R	3	

	e)	A pipe line changes in size from 30cm dia. At A to 60cm at B. It is used to carry oil of specific gravity 0.80. Point A is 5m lower than point B and the pressure are 80KN/m^2 and 60KN/m^2 respectively. If the discharge is 200Lit/sec find the loss of head and direction of flow.	A	3	
	f)	Explain flownet and state its uses	U	3	
Q.4		Attempt any **FOUR**:			08
	a)	Define equivalent pipe.	R	4	
	b)	Define wetted perimeter and hydraulic radius.	R	5	
	c)	Enlist any four types of miner losses.	U	4	
	d)	State any four uses of pitot tube.	U	5	
	e)	State the use of foot valve in the pump.	U	6	
	f)	Enlist various hydraulic coefficients for orifice and state relation between them.	R	4	
Q.5		Attempt any **FOUR**:			16
	a)	Explain Moody's diagram and state its application.	R	4	
	b)	Find the bed slope of trapezoidal channel of bed width 6m, depth of water 3m and side slope of 3H to 4V when the discharge through channel is 30m^3/sec. Take Chezy's constant C=70.	A	5	
	c)	A 100mm diameter orifice discharge 40 lit/sec liquid under constant head of 2m. The diameter of jet at Vena-contracta is 90mm. calculate Cd, Cv and Cc.	A	4	
	d)	Differentiate between centrifugal pump and reciprocating pump.	A	6	
	e)	Define friction factor and state any four factors affecting friction factor.	R	4	
	f)	State any four advantages of triangular notch over rectangular notch.	U	5	
Q.6		Attempt any **FOUR**:			16
	a)	State and explain Dupuits equation for equivalent pipe.	U	4	
	b)	Draw a neat sketch of cup type current meter and explain its working.	U	5	
	c)	Define Siphon. Give uses of it.	R	4	
	d)	Find the discharge through a rectangular channel of width 2m, having a bed slope of 4 in 8000. The depth of flow is 1.5m and take the value of N is Mannings formula as 0.012.	A	5	
	e)	Find the power required to drive a centrifugal pump which delivers 50 lit/s of water to height of 20m through a 150mm diameter and 120m long pipe line. The overall efficiency of pump is 75%. Assume Darcy's f =0.06, total minor loss = 0.35m.	A	6	
	f)	Explain with neat sketch most economical section.	U	5	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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ODD TERM END EXAM WINTER -2023

EXAM SEAT NO.

LEVEL : - **THIRD**   PROGRAM : **CIVIL ENGINEERING**
COURSE CODE :- **CEG306**
COURSE NAME **HYDRAULICS**
MAX. MARKS : 80   TIME : 03Hrs.   DATE :- **11/ 12 / 2023**

Instruction :-

1) Answers must be written in the main answer book provided.(and supplements if required)
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	SQN	Question Text	R/U/A	Co CEG 306	Marks
Q.1		Attempt any **FOUR:**			08
	a)	Define viscosity and give its unit.	R	1	
	b)	Convert a pressure of 100KPa into 'm' of carbon tetrachloride of relative density 1.6.	A	1	
	c)	Define pressure and give its unit.	R	2	
	d)	Give any two applications of Pascal's Law.	U	2	
	e)	State any two applications of Reynold's number.	U	3	
	f)	List any four locations in irrigation where hydraulic principles are used.	U	1	
Q.2		Attempt any **FOUR:**			16
	a)	A 400 ml of certain liquid weight 9N. Calculate the weight density, mass density & specific gravity of liquid.	A	1	
	b)	The specific weight of liquid is 10KN/m^3. Determine its i) Specific gravity ii) Mass density.	A	1	
	c)	When C.P. & C G. will coincide with each other.	U	2	
	d)	A circular plate 1.5m dia. is placed vertically in water so that centre of plate is 2·5m below free surface. Determine total pressure on plate and C.P. depth.	A	2	
	e)	Define absolute pressure, Gauge pressure, vacuum pressure and show the relationship.	U	2	
	f)	A pipeline gradually varies from 15cm dia. at A to 7.5cm dia. At B. Point A is 6m above the datum and point B is 3m above the datum, velocity at A is 3.6 m/sec. Determine pressure at B, if pressure of A is 9.81N/cm^2.	A	3	
Q.3		Attempt any **FOUR:**			16
	a)	Explain with neat sketch working of Bourdon's pressure gauge.	U	1	
	b)	Atmospheric pressure is 720mm of mercury Gauge pressure measured is 22.5N/cm^2. Determine the absolute pressure in terms of i) Meter of water ii) in KN/m^2.	U	2	
	c)	A tank contains water for a height of 0.5mand an immercible liquid of specific gravity 0.8 above the water for a height of 1m. Find the resultant pressure per meter length of tank.	A	2	

	d)	Define the following terms
		    i) Steady flow ii) Uniform flow iii) Streamline flow
		    iv) Equipotential lines.
			R	3	

	e)	A pipe line changes in size from 30cm dia. At A to 60cm at B. It is used to carry oil of specific gravity 0.80. Point A is 5m lower than point B and the pressure are 80KN/m^2 and 60KN/m^2 respectively. If the discharge is 200Lit/sec find the loss of head and direction of flow.	A	3	
	f)	Explain flownet and state its uses	U	3	
Q.4		Attempt any **FOUR**:			08
	a)	Define equivalent pipe.	R	4	
	b)	Define wetted perimeter and hydraulic radius.	R	5	
	c)	Enlist any four types of miner losses.	U	4	
	d)	State any four uses of pitot tube.	U	5	
	e)	State the use of foot valve in the pump.	U	6	
	f)	Enlist various hydraulic coefficients for orifice and state relation between them.	R	4	
Q.5		Attempt any **FOUR**:			16
	a)	Explain Moody's diagram and state its application.	R	4	
	b)	Find the bed slope of trapezoidal channel of bed width 6m, depth of water 3m and side slope of 3H to 4V when the discharge through channel is 30m^3/sec. Take Chezy's constant C=70.	A	5	
	c)	A 100mm diameter orifice discharge 40 lit/sec liquid under constant head of 2m. The diameter of jet at Vena-contracta is 90mm. calculate Cd, Cv and Cc.	A	4	
	d)	Differentiate between centrifugal pump and reciprocating pump.	A	6	
	e)	Define friction factor and state any four factors affecting friction factor.	R	4	
	f)	State any four advantages of triangular notch over rectangular notch.	U	5	
Q.6		Attempt any **FOUR**:			16
	a)	State and explain Dupuits equation for equivalent pipe.	U	4	
	b)	Draw a neat sketch of cup type current meter and explain its working.	U	5	
	c)	Define Siphon. Give uses of it.	R	4	
	d)	Find the discharge through a rectangular channel of width 2m, having a bed slope of 4 in 8000. The depth of flow is 1.5m and take the value of N is Mannings formula as 0.012.	A	5	
	e)	Find the power required to drive a centrifugal pump which delivers 50 lit/s of water to height of 20m through a 150mm diameter and 120m long pipe line. The overall efficiency of pump is 75%. Assume Darcy's f =0.06, total minor loss = 0.35m.	A	6	
	f)	Explain with neat sketch most economical section.	U	5	

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