EVEN 2025-26

CE19R501/CE19501

GOVERNMENT POLYTECHNIC MUMBAI
TERM END EXAMINATION

Programme : **Civil Engineering (Sandwich Pattern)**
Course Title : **Estimation & Costing**

2:30 Hours/ 60 marks Enrolment No. | | | | | | | | | |

Instructions:
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

Q.1 Attempt any SIX **12 Marks**

a. Define budget provision. **[CO-2, L-U]**
b. State the two purpose of costing. **[CO-1, L-A]**
c. Define approximate estimate. **[CO-1, L-U]**
d. State the methods of approximate estimate. **[CO-1, L-U]**
e. Define squaring. **[CO-2, L-U]**
f. Define contingencies. **[CO-3, L-U]**
g. State the necessity of earth work calculation. **[CO-5, L-A]**
h. State the purpose of rate analysis. **[CO-4, L-A]**
i. Define task work. **[CO-4, L-U]**

Q.2 Attempt any THREE **12 Marks**

a. State the purpose of revised and supplementary estimate. **[CO-2, L-U]**
b. Describe role and responsibility of estimator. **[CO-1, L-U]**
c. State the four purpose of approximate estimates. **[CO-2, L-U]**
d. The cost of construction of school building is 250 lakhs for a capacity of 600 students and area of construction is 1600 m^2. Prepare approximate estimate of newly proposed school building for 1500 students with area 5000m^2. Use plinth area method. **[CO-2, L-A]**

Q. 3 Attempt any THREE **12 Marks**

a. Describe detailed specification of P.C.C. 1:4:8 for foundation concrete. **[CO-3, L-A]**
b. Explain cubical content method with suitable example. **[CO-3, L-U]**
c. State provisional quantities and bill of quantities. **[CO-4, L-U]**
d. State the advantages of bar bending schedule. **[CO-4, L-U]**

Q. 4 Attempt any FOUR **12 Marks**

a. State the data required for detailed estimate. **[CO-3, L-R]**
b. Explain prismoidal formula. **[CO-5, L-A]**
c. Describe mid sectional area method. **[CO-5, L-U]**
d. State the factors affecting the task work. **[CO-4, L-U]**
e. State the categories of labour. **[CO-3, L-R]**

Q. 5 Attempt any TWO **12 Marks**

a. Work out the quantities of an item P.C.C. in 1:4:8 in foundation. All dimension are in mm. Use centre line method from figure no.1. **[CO-4, L-A]**

b. Explain in detailed mean sectional area method and draw tabular form for calculating quantities of earth work. **[CO-5, L-A]**

c. Estimate the quantity of cement sand and brick for a wall 6 m long, 3m high and 23cm thick with cement mortar (1:5) and size of brick (19cm X 9cm X 9cm) **[CO-5, L-A]**

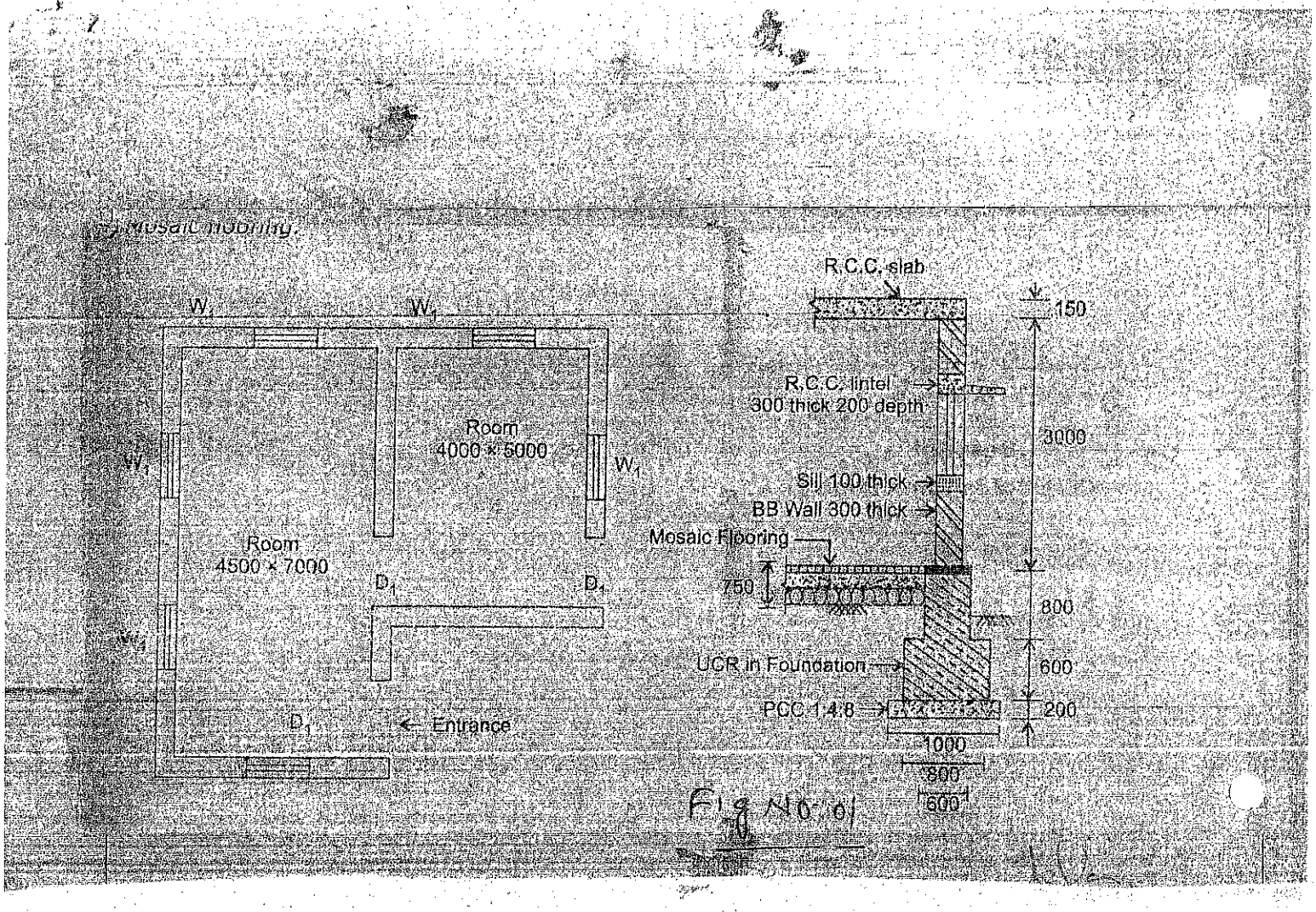


Fig No. 01

****End****

EVEN 2025-26

AM19201 / AM19201

GOVERNMENT POLYTECHNIC MUMBAI
TERM END EXAMINATION

Programme : CE/ME Engineering
Course Title : Engineering Mechanics

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | |

***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

Q.1 Attempt any SIX **12 Marks**

a. Define Simple and Compound machine. **[CO-1, L-R]**
b. State any two uses of Simple machines. **[CO-1, L-R]**
c. Define Statics and Dynamics. **[CO-2, L-R]**
d. Write the classification of force systems. **[CO-2, L-U]**
e. State Varignon's theorem of moments. **[CO-2, L-R]**
f. Calculate and show the centroid of a circle of 50 mm diameter. **[CO-5, L-U]**
g. Define Centroid and Centre of gravity. **[CO-5, L-R]**
h. Define Velocity and Acceleration. **[CO-6, L-R]**
i. Define Angular Acceleration and Angular Displacement. **[CO-6, L-R]**

Q.2 Attempt any THREE **12 Marks**

a. Derive the relationship between Velocity Ratio, efficiency & Mechanical advantage. **[CO-1, L-U]**
b. Calculate the resultant of two forces having magnitude 650 N and 450 N and acting at 60° to one another. **[CO-2, L-A]**
c. Sate any two types of beams with sketches. **[CO-3, L-A]**
d. State four laws of Static friction. **[CO-4, L-U]**

Q. 3 Attempt any THREE **12 Marks**

a. Forces of 1 KN, 2 KN, 3 KN and 4 KN are acting at a point in the direction North-East, North-West, South-West and South-East. Find the magnitude, direction and position on the resultant. **[CO-2, L-A]**
b. State and explain Lami's theorem with sketch. **[CO-3, L-A]**
c. A block of 450 N is kept on a horizontal surface. A horizontal force of 190 N is required to just move it. Find i) Normal reaction ii) Frictional resistance and iii) Coefficient of friction. **[CO-4, L-A]**
d. A motor car takes 10 seconds to cover 30 meters and 12 seconds to cover 42 meters. Find the uniform acceleration of the car and its velocity at the end on 15 seconds. **CO-6, L-A]**

Q. 4 **Attempt any FOUR** **12 Marks**

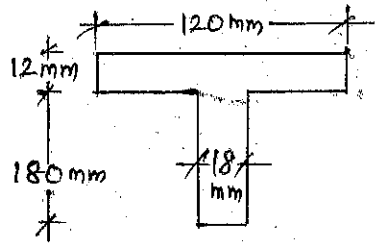
a. A certain machine has an efficiency of 48%. The velocity ratio of the machine is 200. Find the effort required to lift a load of 5 KN using this machine. **[CO-1, L-A]**

b. State and explain the law of Parallelogram of forces **[CO-2, L-A]**

c. State Concept of Static friction. **[CO-4, L-U]**

d. A body of weight 400 N, resisting on a inclined plane inclined at an angle 30° with the horizontal just started to move down the plane. Calculate
i) Coefficient of friction ii) Normal Reaction iii) Angle of repose. **[CO-4, L-A]**

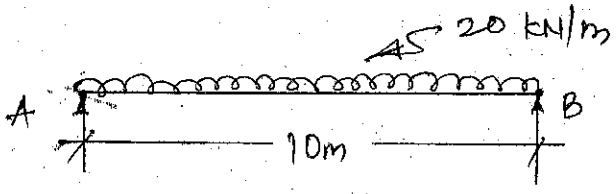
e. Find centroid of a below section **[CO-5, L-A]**



Q. 5 **Attempt any TWO** **12 Marks**

a. A machine lifts a load 350 N and 550 N by efforts of 55 N and 75 N respectively. Find law of machine and efficiency at a load of 1 KN, if V.R. is 24, also identify the type of machine and give example of it. **[CO-1, L-A]**

b. A simply supported beam having a span of 10 m carries a udl of 20 KN/m throughout the span. Find the support reaction at both ends of the beam. **[CO-3, L-A]**



c. Find the centroid of dam section having top width 4 m, bottom width 12 m and height 16 m. Water retaining face is vertical. There is a circular hole of 3 m diameter with its centre at a height of 6 m from bottom and 3 m from vertical face. **[CO-5, L-A]**

****E

EVEN 2025-26 CE19406 | CE19R406

GOVERNMENT POLYTECHNIC MUMBAI
TERM END EXAMINATION

Programme : Civil Engineering (Sandwich Pattern)
Course Title : Material Management

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | |

***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

Q.1 Attempt any SIX **12 Marks**

a. State importance of Material Management **[CO1, L-R)**
b. State scope of Material management **[CO-1, L-R]**
c. Define i) Lead Time (ii) Re-Order Point **[CO-2, L-R]**
d. State Objectives of ABC analysis **[CO-2, L-R]**
e. Define (i) Buy (ii) Lease **[CO-3, L-R]**
f. Define Inventory Return Ratio **[CO-4, L-R]**
g. Define - Just In Time **[CO-5, L-R]**
h. Define (i) Obsolete (ii) Surplus **[CO-6, L-R]**
i. State role of Survey Committee in sale by auction method **[CO-6, L-A]**

Q.2 Attempt any THREE **12 Marks**

a. Explain buying techniques. **[CO-3, L-A]**
b. State any four advantages and limitations of A-B-C analysis **[CO-2, L-A]**
c. Explain any four problems in relation with Supplier. **[CO-3, L-U]**
d. Explain Codification with its benefits. **[CO-4,L-U]**

Q. 3 Attempt any THREE **12 Marks**

a. Explain ethics in purchasing (any 4 points) **[CO-3, L-U]**
b. Explain integrated computerized management system **[CO-5, L-U]**
c. Explain SAP **[CO-5, L-U]**
d. State reasons for generation of Surplus, Obsolete and Scrap **[CO-6, L-U]**

Q. 4 Attempt any FOUR **12 Marks**

a. Define material management **[CO-1, L-R]**
b. Define Value Analysis and state its scope. **[CO-3, L-R]**
c. Explain how will you manage inventory of recycled materials on construction site **[CO-4, L-A]**
d. Define Standardization **[CO-4, L-R]**
e. State any three advantages of SAP **[CO-5, L-U]**

Q. 5 Attempt any TWO **12 Marks**

a. Explain graphical representation of A-B-C analysis **[CO-2, L-A]**

b. Explain Purchase System **[CO-3, L-U]**

c. Explain procedure of sale by tendering method **[CO-6, L-A]**

****End****

EVEN 2025-26 CE19-02/CE19R402

GOVERNMENT POLYTECHNIC MUMBAI
TERM END EXAMINATION

Programme : **Civil Engineering (Sandwich Pattern)**
Course Title : **Environmental Engineering**

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | |

Instructions:
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

Q.1 Attempt any SIX **12 Marks**

a. State the necessity of water treatment plant. **[CO-1, L-R]**
b. Write down any four factors affecting rate of demand of water. **[CO-1, L-U]**
c. State the various forms of chlorination. **[CO-2, L-R]**
d. State the function of sluice valve. **[CO-3, L-U]**
e. List out any four types of pipes used in conveyance of water. **[CO-3, L-R]**
f. Write the methods of sludge disposal. **[CO-5, L-R]**
g. List out the various physical characteristics of sewage. **[CO-5, L-R]**
h. Draw a neat labeled sketch of P trap. **[CO-6, L-R]**
i. Write at least two functions of traps. **[CO-6, L-R]**

Q.2 Attempt any THREE **12 Marks**

a. Define – i) Sewage ii) Garbage. **[CO-4, L-R]**
b. Describe the process of backwashing of rapid sand filter. **[CO-2, L-U]**
c. List out the various methods of disinfection. Explain any one. **[CO-2, L-R,U]**
d. Draw a neat sketch of radial distribution system. Write its advantages. **[CO-3, L-R,U]**

Q. 3 Attempt any THREE **12 Marks**

a. Explain breakpoint chlorination with a neat sketch. **[CO-2, L-U]**
b. For the following data calculate (forecast) the population of area after 3 decades by arithmetical increase method. **[CO-1, L-A]**

Year	Population
1961	4320
1971	5200
1981	7120
1991	8000
2001	9150

c. Write down the systems of sewerage. Explain any one. **[CO-4, L-*]**
d. Describe trickling filter with a neat sketch. **[CO-5, L-U]**

Q. 4 Attempt any FOUR **12 Marks**

a. Enlist types of intake works. Write factors affecting location of intake (any two at least). **[CO-1, L-R,U]**

b. Draw a neat labeled sketch of building water supply arrangement. **[CO-3, L-U]**

c. List out the types of manhole. Draw a neat sketch of drop manhole with labelling. **[CO-4, L-R,U]**

d. Compare aerobic and anaerobic decomposition (at least three points). **[CO-5, L-U]**

e. Describe single stack system of plumbing with a neat sketch. **[CO-6, L-U]**

Q. 5 Attempt any TWO **12 Marks**

a. Explain the chemical characteristics of water. **[CO-1, L-U]**

b. Explain laying and testing procedure of sewers with a neat sketch. **[CO-4, L-R,U]**

c. Draw a neat layout of sewage treatment plant. Explain i) Screening ii) Sedimentation. **[CO-5, L-U]**

****End****

EVEN 2025-26 CE19R202/CE19202

GOVERNMENT POLYTECHNIC MUMBAI
TERM END EXAMINATION

Programme : Civil Engineering
Course Title : Surveying - I

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | | |

***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

Q.1 Attempt any SIX **12 Marks**

a. State the two principles of survey. **[CO-1, L-R]**
b. Define offset with a neat sketch. **[CO-2, L-R]**
c. Convert the following whole circle bearing to quadrantal bearing i) 320° 10' ii) 148° 30'. **[CO-3, L-A]**
d. Define close traverse and open traverse. **[CO-3, L-R]**
e. Define fore sight and back sight. **[CO-5, L-R]**
f. Define level line and level surface in levelling. **[CO-5, L-R]**
g. State any two instrumental errors in levelling. **[CO-5, L-R]**
h. State any two uses of contour maps. **[CO-6, L-R]**
i. Define contour interval and horizontal equivalent. **[CO-6, L-R]**

Q.2 Attempt any THREE **12 Marks**

a. Classify survey according to instruments used and objective of each. **[CO-1, L-U]**
b. Explain indirect ranging with a neat sketch. **[CO-2, L-U]**
c. The true bearing of a line is N 63° 48' w. What is the magnetic bearing of the line if the magnetic declination is i) 3° 20' W ii) 2° 50' E? **[CO-3, L-U]**
d. How the orientation of plane table is done by back sighting? **[CO-4, L-U]**

Q. 3 Attempt any THREE **12 Marks**

a. State two merits and two demerits of plane table survey. **[CO-4, L-R]**
b. Define bench mark. Enlist its types. Explain any one in detail. **[CO-5, L-U]**
c. The table no-1 shows the page of level field book fill the missing readings and calculate the reduced levels of the stations. **[CO-5, L-A]**

Station	Staff Readings			Rise	Fall	R.L	Remark
	BS	IS	FS				
1	3.185						BM No.1 on the plinth of 4 court buildings. BM NO.2 on the parapet wall of the culvert. BM NO.3 on the top of the compound wall
2	2.164		×		0.661		
3	2.782		2.644				
4	×		0.985				
5		0.430		2.214		591.175	
6	1.569		×		1.034		
7	1.945		0.792				
8	1.342		0.652				
9			×	0.814			

d. State any four characteristics of contours. **[CO-6, L-R]**

Q. 4 Attempt any FOUR **12 Marks**

a. Enlist & explain accessories of plane table survey (any three). **[CO-4, L-R]**
b. Explain well conditioned and ill conditioned triangles. **[CO-2, L-U]**
c. Define bearings, fore bearings and back bearings. **[CO-3, L-R]**
d. List types of levelling staffs and explain any one. **[CO-5, L-R]**
e. Explain interpolation of contours by arithmetic method. **[CO-6, L-U]**

Q. 5 Attempt any TWO **12 Marks**

a. Figure no.1 shows the cross staff survey of the field, plot the cross staff survey and calculate its area.

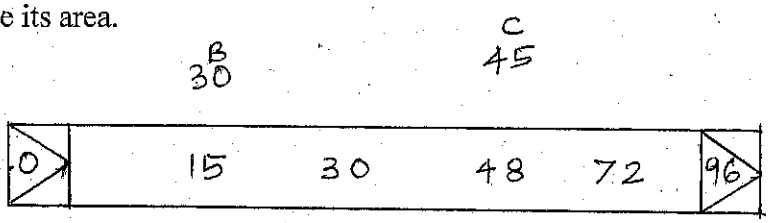


Fig No.1

[CO-2, L-A]

b. The FB and BB were observed in traversing with a compass in a place where local attraction was suspected is shown in table no.2. At what stations do you suspect local attraction? Determine the corrected fore bearing and back bearings.

SR.NO	Line	Fore Bearing	Back Bearing
1	AB	60° 30'	240° 30'
2	BC	99° 15'	278° 0'
3	CD	38° 45'	221° 30'
4	DA	321° 15'	139° 45'

[CO-3, L-A]

c. The following consecutive readings were taken with a level and 4 m staff on a continuously sloping ground at a common interval of 30m.0.780, 1.535, 1.955, 2.430, 2.985, 3.480, 1.155, 1.960, 2.365, 3.640, 0.935, 1.045, 1.630 and 2.545. The reduced level of the first point was 180.750m. Rule out the page of a level field book and enter the above readings. Calculate the reduced levels of the points. Also calculate the gradient of the line joining the first and last point. **[CO-5, L-A]**

≈≈≈≈End≈≈≈≈

EVEN 2025-26 AM19401 /AM19R401

GOVERNMENT POLYTECHNIC MUMBAI
TERM END EXAMINATION

Programme : **Civil Engineering (Sandwich Pattern)**
Course Title : **Theory of Structure**

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | | |

Instructions:
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

Q.1 Attempt any SIX **12 Marks**

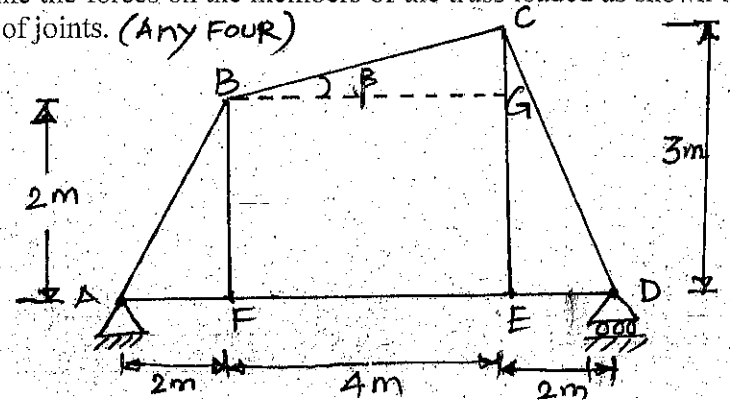
a. Define Slope of a beam. **[CO-2, L-R]**
b. Define carry over moment. **[CO-4, L-R]**
c. State the limit of eccentricity for a circular section. **[CO-1, L-R]**
d. Define Perfect and Imperfect Frame. **[CO-5, L-R]**
e. Define core of Section. **[CO-1, L-R]**
f. A cantilever beam of span 'L' carries point load 'W' at $L/_2$ from the fixed end. State the values of slope at free end. **[CO-2, L-U]**
g. State Clapeyroris therom of Three Moment. **[CO-3, L-R]**
h. State advantages & disadvantages of Fired Beam. **[CO-3, L-U]**
i. Enlist four types of simple frame / truss. **[CO-5, L-R]**

Q.2 Attempt any THREE **12 Marks**

a. A hollow circular column having external diameter 250mm and internal dia 200mm carries a vertical load of 90 N at an eccentricity of 75 mm from center of the column. Calculate σmax and σmin **[CO-1, L-A]**
b. How the distribution factors are determined in moment distribution method? Explain with example. **[CO-4, L-U]**
c. A fired Beam of 4m span carrying U.D.I of intensity 5kN/m over the entire span. Calculate fixed end moment by First Principle **[CO-3, L-A]**
d. A Beam ABC is supported at A, B, C. AB= 6M, BC= 5M, AB Caries UDL of 30KN/M & BC of 25 kN/m. Calculate support moments. **[CO-3, L-A]**

Q. 3 Attempt any THREE **12 Marks**

a. A simply supported beam carries UDL of 2kN/m over the entire span of 3m. find defection at mid span an terms of EI. **[CO-2, L-A]**
b. Determine the forces on the members of the truss loaded as shown in fig. Use method of joints. (Any FOUR)



c. Draw stress distribution diagram for
i)$\sigma 0 > \sigma b$ ii) $\sigma 0 = \sigma b$ iii) $\sigma 0 < \sigma b$ **[CO- 1, L-U]**

d. Draw a neat sketch of Symmetrical & unsymmetrical portal frame. **CO-4, L-U]**

Q. 4 Attempt any FOUR **12 Marks**

a. Explain the principle of superposition with respect to fixed Beam **[CO-3, L-U]**

b. A simply supported Beam of span 5m carries a point load of 20 kN at 2m from the left support. Compute the maximum slope & defection. $I=10^8 mm^4$, $E= 2\times 10^5$ N/mm^2 **[CO-2, L-A]**

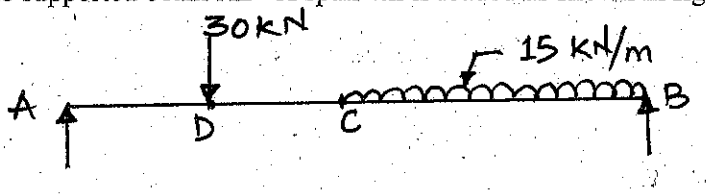
c. Explain the procedure of moment distribution method. **[CO-4, L-U]**

d. Calculate core of section for Rectangular cross-section 250 ×500 mm in size **[CO-1, L-A]**

e. State Four assumptions made in the analysis of simple frame. **[CO-5, L-U]**

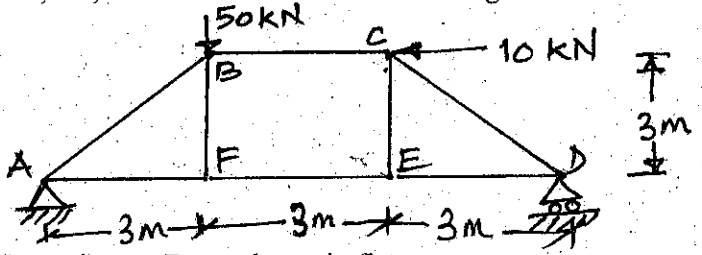
Q. 5 Attempt any TWO **12 Marks**

a. A simple supported beam AB of span 4m is loaded as shown in fig.



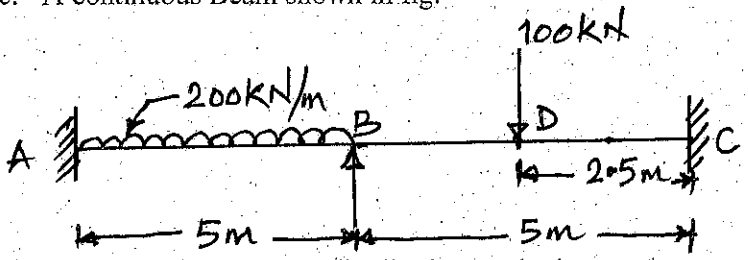
Determine the slope at A and detection at mid span. Assume EI=4000 km.m^2 **[CO-2, L-A]**

b. Analyse the frame by method of joint ~~weather~~, find the forces in members of BC, BE, and FE of the frame shown in fig.



[CO-5, L-A]

c. A continuous Beam shown in fig.



Solve by using moment distribution method. **[CO-4, L-A]**

****End****

EVEN 2025-26

CE19R401/CE19401

GOVERNMENT POLYTECHNIC MUMBAI
TERM END EXAMINATION

Programme : **Civil Engineering (Sandwich Pattern)**
Course Title : **Hydraulics**

2:30 Hours/ 60 marks Enrolment No. | | | | | | | | | |

Instructions:
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

Q.1 Attempt any SIX **12 Marks**

a. State four applications of hydraulics. **[CO-1, L-U]**
b. What is Gauge pressure? **[CO-2, L-R]**
c. State the methods of pressure measurement. **[CO-2, L-R]**
d. State the continuity equation of fluid flow with meaning of all terms. **[CO-3, L-R]**
e. State Bernoulli's theorem with its equation. **[CO-3, L-R]**
f. What do you mean by major head loss in pipe? **[CO-4, L-U]**
g. State the devices used for velocity measurement of liquid flow. **[CO-5, L-R]**
h. What is the condition of most economic section for rectangular channel? **[CO-5, L-R]**
i. Define manometric head for pump. **[CO-6, L-R]**

Q.2 Attempt any THREE **12 Marks**

a. A liquid weighs 30 kN and occupies 4 m^3. Find its specific weight mass density, specify gravity. **[CO-1, L-A]**
b. Determine the total pressure acting on one side and bottom of square tank containing water upto depth 2.5m and length 3m. Take width of tank 3.0m. **[CO-2, L-A]**
c. A partition wall divides storage tank. On one side water is stored upto depth 3.5m and on another side it is upto depth of 2.5m. Determine resultant pressure on partition wall per meter. **[CO-2, L-A]**
d. Define : (i) Laminar flow (ii) Turbulent flow (iii) Uniform flow (iv) Non-uniform flow. **[CO-3, L-R]**

Q. 3 Attempt any THREE **12 Marks**

a. A pipeline consists of three pipes in series, the lengths of pipes are 250 m, 700m and 600 m and diameter. 700 mm, 600 mm and 450 mm. Determine an equivalent diameter of pipe. **[CO-4, L-A]**
b. A venturimeter fitted in a pipe of diameter 30 cm has a throat diameter 15cm. If the manometer reading is 6cm of mercury, find discharge through pipe. Take $C_d = 0.98$. **[CO-4, L-A]**
c. Due to sudden enlargement of water supply line from 200 mm to 400 mm diameter of pipe, loss of head is 200 mm of water. Calculate discharge through pipe. **[CO-4, L-A]**

d. Find the discharge when the head of water is 22 cm for (i) Triangular notch with 60^0 (ii) Rectangular notch 1.5m long.
Take $C_d = 0.6$ for both notches. **[CO-5, L-A]**

Q. 4 Attempt any FOUR **12 Marks**

a. Define Reynold's number. State applications of Reynold's number. **[CO-3, L-R]**

b. State different types of energies associated with liquid flow with their formula. **[CO-3, L-U]**

c. Define : (i) Hydraulic gradient line (ii) Total energy line. **[CO-4, L-U]**

d. A rectangular channel 6 m wide and 2.5 m deep carrying water with bed slope 1 in 1500. Calculate discharge through channel. Take Manning's constant, N = 0.024. **[CO-5, L-R]**

e. State different types of pumps with their use. **[CO-6, L-U]**

Q. 5 Attempt any TWO **12 Marks**

a. A rectangular plate is 3 m wide and 5 m deep. It lies vertical in water. Find total pressure and position of centre of pressure when it's upper edge is horizontal and (i) Coincides with water and (ii) 2.5 m below free water surface. **[CO-2, L-A]**

b. Draw a neat sketch of lay-out of centrifugal pump and show components of pump. Also show and explain in brief different heads of pump. **[CO-6, L-U]**

c. Determine the most economical section of a trapezoidal channel for carrying discharge 20 m^3/sec with bed slope of 1 : 4500. The side slopes are 4H : 3V. Take Manning's constant as 0.015. **[CO-5, L-A]**

****End****

EVEN 2025-26 CE19R505/CE19505

GOVERNMENT POLYTECHNIC MUMBAI
TERM END EXAMINATION

Programme : **Civil Engineering**
Course Title : **Solid Waste Management**

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | | |

***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

Q.1 Attempt any SIX **12 Marks**

a. Define the term 'Solid waste'. **[CO-1, L-R]**
b. List any four factors affect solid waste generation. **[CO-1, L-R]**
c. List the tools and equipments used for storage and collection of solid waste. **[CO-2, L-R]**
d. List the collection methods of municipal solid waste. **[CO-2, L-R]**
e. State the principle of composting process. **[CO-3, L-R]**
f. Define the term 'Bio-medical waste'. **[CO-4, L-R]**
g. Give the sources of Bio-medical waste generation. **[CO-4, L-U]**
h. Define the term 'E-waste'. **[CO-5, L-R]**
i. Define the term 'Segregation' of municipal solid waste. **[CO-6, L-R]**

Q.2 Attempt any THREE **12 Marks**

a. Explain impact of solid waste on environment. **[CO-1, L-U]**
b. Explain the role of rag pickers in solid waste management. **[CO-2, L-U]**
c. State advantages and disadvantages of land fill method. **[CO-3, L-U]**
d. Explain collection method of Bio-medical waste in municipal corporation areas. **[CO-4, L-U]**

Q. 3 Attempt any THREE **12 Marks**

a. State any four physical characteristics of municipal solid waste. **[CO-1, L-U]**
b. Give classification of 'Bio-medical waste'. **[CO-4, L-U]**
c. Explain collection method and disposal of industrial waste. **[CO-5, L-U]**
d. Explain health aspects during handling of municipal solid waste. **[CO-6, L-U]**

Q. 4 Attempt any FOUR **12 Marks**

a. Explain transportation of municipal solid waste and vehicles used for the transportation. **[CO-2, L-U]**
b. Explain solid waste management hierarchy. **[CO-1, L-U]**
c. State management technologies of prio-medical waste. **[CO-4, L-U]**
d. State the danger of 'E-waste' to the environment. **[CO-5, L-U]**
e. State the importance of recycling the industrial waste. **[CO-5, L-U]**

Q. 5 Attempt any TWO **12 Marks**

a. Draw organization pattern of solid waste management for metro city. **[CO-2, L-A]**

b. Explain with sketch 'Land fill method' of disposal of municipal solid waste. **[CO-3, L-A]**

c. Explain in detail importance of public involvement and participation in solid waste management. **[CO-6, L-U]**

****End****

EVEN 2025-26 CE19301/CE19R301

GOVERNMENT POLYTECHNIC MUMBAI
TERM END EXAMINATION

Programme : Civil Engineering (Sandwich Pattern)
Course Title : Construction Technology

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | | |

***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

Q.1 Attempt any SIX **12 Marks**

a. What is timbering & strutting? **[CO-2, L-U]**
b. What are the requirements of good foundation? **[CO-2, L-U]**
c. Define corbel & cornice. **[CO-3, L-R]**
d. Define & draw king closer. **[CO-3, L-R]**
e. State the components of door. **[CO-4, L-U]**
f. Define vertical communication. **[CO-4, L-R]**
g. Enlist the types of floor finishes. **[CO-5, L-R]**
h. Define pointing. **[CO-5, L-R]**
i. State the purposes of scaffolding. **[CO-6, L-U]**

Q.2 Attempt any THREE **12 Marks**

a. Explain under-reamed pile foundation with neat sketch. **[CO-2, L-U]**
b. Explain the types of joints. **[CO-3, L-U]**
c. Explain the types of staircase. **[CO-4, L-U]**
d. Explain the types of paints. **[CO-4, L-U]**

Q. 3 Attempt any THREE **12 Marks**

a. State the criteria of good ventilation. **[CO-4, L-U]**
b. Explain the necessity of plastering. **[CO-5, L-A]**
c. State the requirements of good form-work. **[CO-6, L-U]**
d. Explain the process of erection & dismantling. **[CO-6, L-A]**

Q. 4 Attempt any FOUR **12 Marks**

a. Define building & give the classification of building as per National building code. **[CO-1, L-R]**
b. Define the following term : i) DPC ii) Sill iii) Parapet. **[CO-1, L-R]**
c. What is raft foundation? **[CO-2, L-U]**
d. Give the requirements of good stone masonary. **[CO-3, L-R]**
e. State the function of window, sill & lintel. **[CO-4, L-U]**

Q. 5 Attempt any TWO **12 Marks**

a. Explain in detail types of foundation. **[CO-2, L-A]**

b. Define mortars & explain the types of mortar. **[CO-3, L-R]**

c. Define plastering & explain the procedure. **[CO-5, L-R]**

****End****

EVEN 2025-26 AM19R302/AM19302

GOVERNMENT POLYTECHNIC MUMBAI
TERM END EXAMINATION

Programme : Civil Engineering
Course Title : Soil Mechanics

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | | |

***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

Q.1 Attempt any SIX **12 Marks**

a. State IS definition of soil. **[CO-1, L-R]**
b. List out sequential sieves size for sieve analysis of aggregates as per IS code. **[CO-3, L-U]**
c. Define compaction & consolidation. **[CO-4, L-R]**
d. Enlist methods to improve bearing capacity of soil. **[CO-6, L-R]**
e. Define cohesion of soil. **[CO-5, L-R]**
f. State Darcy's law of permeability. **[CO-5, L-R]**
g. Define bearing capacity of soil. **[CO-6, L-R]**
h. Draw three phase diagram of soil. **[CO-2, L-U]**
i. Define void ratio & water content. **[CO-2, L-R]**

Q.2 Attempt any THREE **12 Marks**

a. State the field applications of soil mechanics in foundation design. **[CO-1, L-U]**
b. A soil sample has porosity of 25% and specific gravity of 2.67. Calculate void ratio and dry density. **[CO-2, L-A]**
c. State any four use of Geo fabric as filters. **[CO-5, L-U]**
d. Explain any two factors affecting bearing capacity of soil. **[CO-6, L-U]**

Q. 3 Attempt any THREE **12 Marks**

a. Explain classification of soil as per IS:460. **[CO-3, L-U]**
b. Find coefficient of uniformity Cu and coefficient of curvature C_c for a soil particle if D_{10}=0.15mm, D_{30}=0.75mm and D_{60}=2mm. **[CO-3, L-A]**
c. State the factors affecting compaction. **[CO-4, L-U]**
d. Elaborate any two field compaction methods. **[CO-4, L-A]**

Q. 4 Attempt any FOUR **12 Marks**

a. Explain pycnometer method to determine specific gravity. **[CO-2, L-U]**
b. Elaborate different stages of consistency. **[CO-3, L-U]**
c. Write short note on particle size distribution curve. **[CO-3, L-R]**
d. Explain the concept of shear strength of soil. **[CO-5, L-U]**
e. Explain the effect of water table on bearing capacity of soil. **[CO-6, L-U]**

Q. 5 Attempt any TWO **12 Marks**

a. The density of soil sample is 2000kg/m^3 & its water content is 16%. Determine its dry density, void ratio, porosity & degree of saturation. **[CO-2, L-A]**

b. Differentiate between compaction and consolidation of soil (four points). Define zero air void line. **[CO-4, L-U]**

c. Define permeability and explain factors affecting permeability. **[CO-5, L-U]**

****End****

EVEN 2025-26 CE19303 /CE19R303

GOVERNMENT POLYTECHNIC MUMBAI
TERM END EXAMINATION

Programme : Civil Engineering (Sandwich Pattern)
Course Title : Surveying – II

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | |

***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

Q.1 Attempt any SIX **12 Marks**

a. Define the term transiting. **[CO-1, L-R]**
b. List fundamental axes of transit theodolite. **[CO-1, L-R]**
c. Define consecutive co-ordinates. **[CO-2, L-R]**
d. Define tachometric surveying. **[CO-3, L-R]**
e. List the types of horizontal curves used in roads alignment. **[CO-4, L-R]**
f. State the use of digital planimeter. **[CO-5, L-R]**
g. State the uses of total station. **[CO-5, L-R]**
h. State active remote sensing system. **[CO-6, L-R]**
i. State the use of global positioning system. (G.P.S.) **[CO-6, L-R]**

Q.2 Attempt any THREE **12 Marks**

a. Explain the procedure for temporary adjustment of transit theodolite. **[CO-1, L-U]**
b. Explain the procedure of traversing by included angle method with sketch. **[CO-2, L-U]**
c. Explain field method of determining constants of tachometer. **[CO-3, L-U]**
d. Draw sketch of simple circular curve and label the component parts. **[CO-4, L-A]**

Q. 3 Attempt any THREE **12 Marks**

a. Explain procedure of measurement of horizontal angle by repetition method. **[CO-1, L-U]**
b. For a closed traverse ABCDE the length and bearings of the lines are given below. Compute the latitudes and departures. **[CO-2, L-A]**

Line	AB	BC	CD	Define	EA
Length (m)	363	218	163	196	279
Bearings	$326^0 50'$	$39^0 08'$	$169^0 40'$	$103^0 06'$	$212^0 20'$

c. In a traverse the latitudes and departures of the sides were calculated and it was observed that Σ Latitude = 1.39 and Σ Departure = -2.17. Calculate the length and bearing of the closing error. **[CO-2, L-A]**
d. Explain principle of electronic distance meter (E.D.M.) and use of E.D.M. (any two) **[CO-5, L-U]**

Q. 4 Attempt any FOUR **12 Marks**

a. Explain temporary adjustment of total station. **[CO-5, L-U]**
b. State any three applications of remote sensing. **[CO-6, L-U]**
c. State three applications of GIS in surveying. **[CO-6, L-U]**
d. State LiDAR survey. **[CO-5, L-U]**
e. Derive the relation between degree and radius of curve. **[CO-4, L-A]**

Q. 5 Attempt any TWO **12 Marks**

a. The following readings were taken by a tachometer with the staff held vertical. The tacheometer is fitted with an anallatic lens and the multiplying constant is 100. Find out the horizontal distance from A to B and R.L. of B.

Inst. Station	Staff Station	Vertical Angle	Staff reading (m)	Remarks
A	B.M.	- $6^0 0'$	1.100,1.153,2.060	RL of B.M.
A	B	+ $8^0 0'$	0.982, 1.105, 1.188	= 976.00m

[CO-3, L-A]

b. Two tangents meet at chainage 1022m. the deflection angle being 36^0. A circular curve of radius 300m is to be introduced in between them. Calculate the : (i) Tangent length (ii) Length of circular curve (iii) Chainage of the tangent points. **[CO-4, L-A]**
c. Find the corrected consecutive co-ordinates applying Bowditch's rule for traverse ABCDEA from the data given below. **[CO-2, L-A]**

Line	Length (m)	Consecutive Coordinates	
		Latitude	Departure
AB	70	+21.500	-65.450
BC	80	- 80.755	-5.250
CD	43	- 41.000	+13.550
DE	38	-14.250	+35.150
EA	115	+114.150	+22.315

****END****

EVEN 2025-26 CE19R502/CE19502

GOVERNMENT POLYTECHNIC MUMBAI
TERM END EXAMINATION

Programme : Civil Engineering (Sandwich Pattern)
Course Title : Contracts, Accounts & Valuation

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | |

Instructions:
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

Q.1 Attempt any SIX **12 Marks**

a. Draw the organizational chart of PWD. **[CO-1, L-R]**
b. Define master rolls. **[CO-1, L-U]**
c. Define contract. **[CO-2, L-R]**
d. State any two advantage of percentage rate contract. **[CO-2, L-U]**
e. Define arbitration. **[CO-3, L-U]**
f. Define tender. **[CO-3, L-U]**
g. Define interim payment. **[CO-4, L-R]**
h. Define retention money. **[CO-4, L-R]**
i. Define valuation. **[CO-5, L-U]**

Q.2 Attempt any THREE **12 Marks**

a. State the salient features of BOT project. Give two examples of BOT project. **[CO-2, L-R]**
b. Explain earnest money and security deposit. **[CO-3, L-U]**
c. Draw a format of nominal muster roll. **[CO-4, L-U]**
d. Define (i) Value (ii) Price. **[CO-5, L-R]**

Q. 3 Attempt any THREE **12 Marks**

a. Name any four types of contract. Explain any one contract in detail. **[CO-2, L-R]**
b. Explain schedule 'A' draw its tabular form. **[CO-3, L-R]**
c. Explain indent and invoice. **[CO-4, L-R]**
d. What are the different factors affecting on value of property? **[CO-5, L-U]**

Q. 4 Attempt any FOUR **12 Marks**

a. Define administrative approval and technical sanction. **[CO-1, L-U]**
b. List the documents to be submitted at the time of registration as a contractor. **[CO-2, L-R]**
c. Under which circumstances lowest tenders are rejected by department. **[CO-3, L-U]**
d. Differentiate running bill and final bill (on any three points) **[CO-4, L-U]**
e. State (i) Depreciation (ii) Scrap value. **[CO-5, L-R]**

Q. 5 Attempt any TWO **12 Marks**

a. Explain in detail classification of contract and various document required for it. **[CO-2, L-U]**

b. Draft a tender notice for construction of Polytechnic college building in your campus. Costing 5 Cr. Assume suitable data. **[CO-3, L-A]**

c. A building has been constructed for 18,00,000/- Assuming its scrap value at the end of 50 years as Rs.50000/- determine depreciation by straight line method. **[CO-5, L-A]**

****END****

EVEN 2025-26

CE19R101

GOVERNMENT POLYTECHNIC MUMBAI
TERM END EXAMINATION

Programme : Civil Engineering (Sandwich Pattern)
Course Title : Construction Materials

2:30 Hours/ 60 marks Enrolment No. | | | | | | | | | |

Instructions:
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

Q.1 Attempt any SIX **12 Marks**

a. State the role of Civil Engineering in human life. **[CO-1, L-R]**
b. Enlist broad classification of materials. **[CO-1, L-R]**
c. State any four types of cement. **[CO-3, L-R]**
d. Enlist different thermal insulating materials. **[CO-4, L-R]**
e. Define water proofing. **[CO-4, L-R]**
f. Enlist types of paints. **[CO-5, L-R]**
g. Enlist properties of paints. **[CO-5, L-U]**
h. Enlist the two uses of rice husk as a construction materials. **[CO-6, L-U]**
i. State different types of construction waste. **[CO-6, L-R]**

Q.2 Attempt any THREE **12 Marks**

a. State criteria for selection of construction material. **[CO-1, L-U]**
b. Enlist types of bituminous material used in construction and explain anyone. **[CO-2, L-U]**
c. State the classification and any two uses of lime. **[CO-2, L-U]**
d. Enlist types of cements and its uses. **[CO-3, L-U]**

Q. 3 Attempt any THREE **12 Marks**

a. Enlist characteristics of good tile. **[CO-3, L-U]**
b. Suggest the treatment for following : **[CO-4, L-A]**
   (i) Water leakages in the slabs
   (ii) Protection from white ants
   (iii) To reduce unwanted heat
   (iv) To reduce noise in particular area
c. State the constituent of cement mortar and their proportions. **[CO-5, L-U]**
d. State properties of bagasse and two uses of bagasse as construction material. **[CO-6, L-U]**

Q. 4 Attempt any FOUR **12 Marks**

a. State anyone example of following construction materials **[CO-1, L-R]**
   (i) Natural (ii) Special (iii) Finishing
b. State properties and uses of particle board. **[CO-3, L-U]**
c. Explain Asbestos fibre. **[CO-4, L-U]**

d. Enlist constituents of plaster of paris and state the two uses of plaster of paris. **[CO-5, L-U]**

e. Enlist properties of coir fibre. **[CO-6, L-U]**

Q. 5 Attempt any TWO **12 Marks**

a. Explain timber with reference to following : **[CO-2, L-U]**
   (i) Properties
   (ii) Cross section of trunk of timber
   (iii) Methods of seasoning

b. Explain stone with reference to : **[CO-2, L-U]**
   (i) Requirement of good building stone
   (ii) Quarrying of stone
   (iii) Characteristics of stone

c. Explain bricks with reference to following : **[CO-3, L-U]**
   (i) Characteristics of good brick
   (ii) Common field tests on bricks
   (iii) Classification of bricks and standard size

****End****

EVEN 2025-26 CE19R302/CE19302

GOVERNMENT POLYTECHNIC MUMBAI
TERM END EXAMINATION

Programme : Civil Engineering
Course Title : Transportation Engineering

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | | |

***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

Q.1 Attempt any SIX **12 Marks**

a. Mention role of transportation in the development of nation. **[CO-1, L-R]**
b. Mention different modes of transportation. **[CO-1, L-R]**
c. Enlist purposes of 'Camber'. **[CO-2, L-R]**
d. Define pavement. Enlist its types. **[CO-3, L-R]**
e. Mention 'Zones' of 'Indian Railways'. **[CO-4, L-R]**
f. Give types of 'Rail Joints'. **[CO-4, L-R]**
g. Define : (i) Cant deficiency (ii) Negative cant. **[CO-5, L-R]**
h. Mention scope of waterways. **[CO-6, L-R]**
i. Give importance of airways. **[CO-6, L-R]**

Q.2 Attempt any THREE **12 Marks**

a. Describe selection & factors affecting road alignment. **[CO-1, L-U]**
b. Define design speed. Explain various factors affecting design speed as per IRC recommendations. **[CO-2, L-R]**
c. Describe with neat sketch 'Penetration Test' on bitumen. **[CO-3, L-U]**
d. Explain the terms : (i) Permanent land (ii) Formation width. **[CO-5, L-R]**

Q. 3 Attempt any THREE **12 Marks**

a. Define gradient. List types of gradients. **[CO-2, L-U]**
b. Describe merits and demerits of WMM road. **[CO-3, L-A]**
c. Write causes & prevention in creep of rail, in railway engineering. **[CO-4, L-U]**
d. Enlist uses of waterways & airways. **[CO-6, L-U]**

EVEN 2025-26

Q. 4 Attempt any FOUR **12 Marks**

a. Draw standard cross-section of national highway in embankment or cutting. **[CO-2, L-U]**

b. Enlist structural components of pavement in roads. Explain its one function of each. **[CO-3, L-U]**

c. List types of rail gauges. Explain factors affecting selection of a gauge. **[CO-4, L-A]**

d. Draw standard cross section of single line broad gauge in cutting or embankment. **[CO-5, L-U]**

e. Explain : (i) Coning of wheel (ii) Tilting of rail in railway track geometrics. **[CO-5, L-U]**

Q. 5 Attempt any TWO **12 Marks**

a. Define curve. Enlist types of horizontal curves. Explain any one with neat sketch. **[CO-2, L-A]**

b. Enlist types of sleepers & ballast. Explain function of sleepers & ballast. **[CO-4, L-U]**

c. Give purpose of station. Explain in brief classification of 'Station Yard'. **[CO-5, L-A]**

***** END*****

EVEN 2025-26 AM19R501 /AM19501

GOVERNMENT POLYTECHNIC MUMBAI
TERM END EXAMINATION

Programme : **Civil Engineering**
Course Title : **Design of Reinforced concrete and steel structures.**

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | |

***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

Q.1 Attempt any SIX **12 Marks**

a. Define the limit state of its types. **[CO1, L-R]**
b. Define lever arm. **[CO1, L-R]**
c. Define characteristic load and characteristic strength. **[CO1, L-R]**
d. State two forms of shear reinforcement. **[CO2, L-R]**
e. Write an expression for minimum eccentricity of axially loaded short column with meaning of each term used in it. **[CO3, L-A]**
f. Why welded connection is advantageous for tension members? **[CO4, L-A]**
g. Sketch laterally restrained beam or Draw channel section with labelling **[CO5, L-R]**
h. What is the radius of gyration. **[CO4, L-R]**
i. State maximum spacing of stirrups as per IS 456. **[CO3, L-R]**

Q.2 Attempt any THREE **12 Marks**

a. Determine the moment of resistance of a singly reinforced beam of width 300mm and overall depth of 400 mm having reinforcement of 4 nos. of 12mm dia at an effective cover of 25mm. **[CO1, L-A]**
b. Design shear reinforcement in the form of vertical stirrups for beam section 300 x 600 mm (effective) reinforcement of 3 no. of 20mm dia subjected to ultimate shear force of 350 KN. Assume M25 concrete and Fe415 steel. τ_c =0.55 N/mm2 **[CO-2, L-A]**
c. Enlist the design procedure steps for column. **[CO-3, L-A]**
d. Describe any two standard beam sections. **[CO-5, L-U]**

Q. 3 Attempt any THREE **12 Marks**

a. Determine the shape factor about x-x axis of the ISMB 400 with root radius omitted. Take fy=250MPa. **[CO-5, L-A]**
b. Explain how different area of reinforcement are calculated in doubly reinforced beam section. **[CO-1, L-U]**
c. Explain bond and development length. **[CO-2, L-U]**
d. Draw a fig of lacing & battening of a section & labeled it. **[CO-4, L-U]**

Q. 4 Attempt any FOUR **12 Marks**

a. State the effective length of column for the following cases (i) effective held in position and restrained against rotation at both ends. (ii) effectively held in position at both ends but not restrained against rotation. **[CO-3, L-U]**

b. Calculate the development length for a bar of 16mm diameter in compression. The grade of steel is fe500 and design bond stress is 1.2N/mm^2 for plain bars in tension. **[CO-2, L-A]**

c. If factored shear force is 216kN, actual shear force force is 221.12 kN, fy = 250MPa, tw =10.2mm, h=500mm then apply check for shear in beams. **[CO-5, L-A]**

d. Calculate working load capacity of a circular column 400mm diameter provided with 6 bars of 16mm diameter. Assume M20 concrete and fe415 steel. **[CO-3, L-A]**

e. Explain lacing and battening briefly. **[CO-4, L-U]**

Q. 5 Attempt any TWO **12 Marks**

a. (i) A single angle 100X75X10mm is used as a tension member of a truss. The longer leg of the angle is connected to the gusset plate with 4 bolts of 20mmϕ. Determine the net effective area of the angle. (ii) If the ends of the longer leg of angle are welded to gusset, determine the net effective area. **[CO-4, L-A]**

b. Calculate depth and area of steel at mid span of a simply supported beam over a clear span 6m. The beam is carrying all inclusive load 20kN/m. Assume 300mm bearings. Use M20 and fe500. (b=1/2 d) **[CO-1, L-A]**

c. Design a simply supported beam of 5m span (effective) carrying a service load of 30kN/m excluding self weight. The beam is laterally supported. Use beam sections from steel table. **[CO-5, L-A]**

****End****

EVEN 2025-26 **CE23111**

GOVERNMENT POLYTECHNIC MUMBAI
TERM END EXAMINATION

Programme : **Civil Engineering (Sandwich Pattern)**
Course Title : **Contracts, Accounts & Valuation**

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | | |

***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

Q.1 Attempt any SIX **12 Marks**

a. Write any two functions of chief engineer. **[CO-1, L-R]**
b. Define contract and state any two types of contract. **[CO-2, L-R]**
c. Define tender. Write any two types of tender. **[CO-3, L-R]**
d. Define the term BOT. **[CO-2, L-R]**
e. Define unbalanced tender. **[CO-3, L-R]**
f. Write any two uses of measurement book. **[CO-4, L-R]**
g. Define indent and invoice. **[CO-4, L-R]**
h. Define cost and price. **[CO-5, L-R]**
i. Write any two types of value. **[CO-5, L-R]**

Q.2 Attempt any THREE **12 Marks**

a. Explain percentage rate contract. **[CO-2, L-U]**
b. Explain different types of tender. **[CO-3, L-U]**
c. Draw organization structure of PWD department. **[CO-1, L-U]**
d. Mention the rules for writing measurement book. **[CO-4, L-U]**

Q. 3 Attempt any THREE **12 Marks**

a. Define the terms i) Earnest money ii) Security deposit. **[CO-3, L-U]**
b. Explain the requirements of valid contract. **[CO-2, L-U]**
c. Explain piece work method. **[CO-1, L-U]**
d. Write different modes of payment to the contractor. **[CO-4, L-U]**

Q. 4 Attempt any FOUR **12 Marks**

a. Explain under what circumstances a tender is rejected. **[CO-3, L-U]**
b. Explain the importance of BOT. **[CO-2, L-U]**
c. Define depreciation. What are different methods of calculating depreciation. **[CO-5, L-U]**
d. Explain different factors affecting valuation. **[CO-4, L-U]**
e. Differentiate between salvage value and scrap value. **[CO-5, L-U]**

Q. 5 Attempt any TWO **12 Marks**

a. Suggest the suitable rent per month of residential bunglow from following data plot 300m^2@Rs.300 per m^2, building 120m^2@Rs.1200/m2, total outgoing 30% of gross rent. Return on construction cost 12% return on cost of plot @8%. **[CO-5, L-U]**

b. Draft a tender notice for construction of WBM road of length 2km. Estimated cost Rs.80 lakhs. **[CO-3, L-U]**

c. A machine was purchased three years back for Rs.17000. Its life is assumed as 10 years. Workout its present value. **[CO-5, L-U]**

****End****

EVEN 2025-26 **CE23103**

GOVERNMENT POLYTECHNIC MUMBAI
TERM END EXAMINATION

Programme : Civil Engineering
Course Title : Surveying-I

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | |

***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

Q.1 Attempt any SIX **12 Marks**

a. Define Surveying. **[CO-1, L-R]**
b. State the principle of chain surveying. **[CO-2, L-R]**
c. Distinguish between well-conditioned and ill-conditioned triangles. (any two points) **[CO-2, L-R]**
d. Define magnetic declination. **[CO-3, L-R]**
e. Enlist different types of levelling. **[CO-4, L-R]**
f. Define Contour. **[CO-5, L-R]**
g. Define Horizontal Equivalent. **[CO-5, L-R]**
h. Enlist the component parts of Digital planimeter. **[CO-6, L-R]**
i. State any two uses of Digital palnimeter. **[CO-6, L-R]**

Q.2 Attempt any THREE **12 Marks**

a. Explain the process of measurement of area using Digital planimeter. **[CO-6, L-U]**
b. State the uses of Contour maps. (any 4) **[CO-5, L-U]**
c. Enlist fundamentals axes of Dumpy level and state its relationship. **[CO-4, L-R]**
d. Explain in detail about Reciprocal levelling with a neat sketch. **[CO-4, L-U]**

Q. 3 Attempt any THREE **12 Marks**

a. State any four objects of surveying. **[CO-1, L-R]**
b. Distinguish between perpendicular and oblique offsets. **[CO-2, L-R]**
c. Define: 1. i) Base line ii) Clock line **[CO-2, L-R]**
2. Local attraction **[CO-3, L-R]**
d. Explain in detail about Indirect-Ranging. **[CO-2, L-U]**

EVEN 2025-26

Q. 4 Attempt any FOUR **12 Marks**

a. Distinguish between closed traverse and open traverse. (any three points) **[CO-3, L-U]**

b. Enlist the component parts of prismatic compass and their functions. **[CO-3, L-R,U]**

c. Explain in brief about fly leveling. **[CO-4, L-U]**

d. Compare between Plane of collimation method (H.I.) and Rise and Fall method of calculating RL. **[CO-4, L-R]**

e. Convert following R.B. to W.C.B.
A) N 15° 15'E
B) N 67° 48' W
C) S 36° 30' W. **[CO-3, L-U]**

Q. 5 Attempt any TWO **12 Marks**

a. Explain the characteristics of contour with a neat sketch. **[CO-5, L-U]**

b. The series of staff Reading observed on a continuously sloping ground are 0.850, 1.650, 2.450, 3.255, 0.655, 1.250, 1.355, 2.650, 3.250, 1.150, 1.655, 2.055, and 3.255. The first reading was taken on B.M. of R.L.150.000. Calculate the R.L's of all points by H.I. method. Apply usual checks. Show tabulation. **[CO-4, L-A]**

c. The following bearings were recorded in running a closed compass traverse ABCDEA. Calculate the included angles of a traverse. **[CO-3, L-]**

Line	Observed Bearings	
	F.B	B.B
AB	110° 0'	290° 0'
BC	30° 15'	210° 15'
CD	244° 45'	64° 45'
DE	310° 0'	130° 0'
EA	193° 0'	13° 0'

****End****

EVEN 2025-26

AM23104

GOVERNMENT POLYTECHNIC MUMBAI
TERM END EXAMINATION

Programme : **Civil Engineering (Sandwich Pattern)**
Course Title : **Theory of Structures**

2:30 Hours / 60 marks Enrolment No.

***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

Q.1 Attempt any SIX **12 Marks**

a. State the middle third rule. **[CO-1, L-R]**
b. State one advantage & one disadvantage of a fixed beam. **[CO-2, L-U]**
c. Define carry over factor. **[CO-3, L-R]**
d. State the relation between slope, deflection and radius of curvature. **[CO-4, L-U]**
e. State any two assumptions in the analysis of frames ((or trusses) **[CO-5, L-R]**
f. Define a frame or truss. **[CO-5, L-R]**
g. State the effect of continuity on beam. **[CO-2, L-U]**
h. Define Distribution factor. **[CO-3, L-R]**
i. Define boundary (end) conditions. **[CO-4, L-R]**

Q.2 Attempt any THREE **12 Marks**

a. A circular chimney 2.25m internal diameter and 3m external diameter is subjected to a uniform horizontal wind pressure of 1000N/m^2 . Determine the maximum height to which the chimney can be raised to have no tension any where at the base. γmasonry = 21kN/m^3 & C = 0.6 **[CO-1, L-A]**
b. A fixed beam of 5m carries a udl of 15kN/m over the entire span. Determine the fixed end moments from the first principle. **[CO-2, L-A]**
c. A continuous beam ABC consists of two spans AB & BC of 6m & 8m respectively. The end supports are simple. The span AB carries a udl of 3kN/m, while the span BC carries a point load of 20kN at 5m from C. Calculate fixed end moments and stiffness factor at joint B. **[CO-3, L-A]**
d. A cantilever truss is loaded as shown in figure . Determine the forces in the members AB, AC & BC by method of joints.

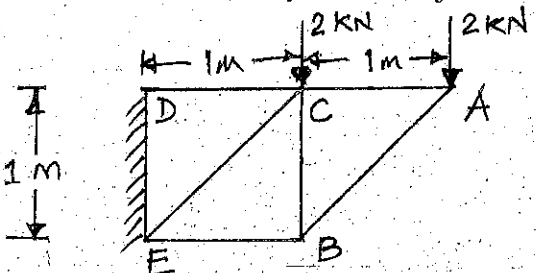


Fig. Q.2 (d)

[CO-5, L-A]

Q. 3 Attempt any THREE **12 Marks**

a. A short masonry pillar is 0.5m × 0.5m in section. At what eccentricity, a point load of 6000kN be placed on one of the centroidal axis of the section so as to produce no tension in the section. **[CO-1, L-A]**

b. State the types of portal frame and define each type of portal frame. **[CO-3, L-U]**

c. A continuous beam ABC consists of two spans AB & BC of 6m & 8m respectively. The end supports are simple. The span AB carries a point load of 50kN at 4m from A. The span BC carries a point load of 70kN at 5m from C. Calculate the fixed end moments. Use Clapeyron's Theorem of three moment. Assume EI as constant. **[CO-2, L-A]**

d. Formulate a final slope equation using Macaulay's method for a simply supported beam of span 5m which is subjected to a point load of 150kN at a distance 2m from the left support. Assume EI as constant. **[CO-4, L-A]**

Q. 4 Attempt any FOUR **12 Marks**

a. For a truss shown in Fig. (1) determine forces in member AC & BC using the method of sections. **[CO-5, L-A]**

b. Define stiffness factor. Also state the stiffness factor for a beam fixed at one end & simply supported at the other end. **[CO-3, L-R]**

c. State the relation between slope, deflection and radius of curvature. **[CO-4, L-R]**

d. State the step by step procedure of determing support moments using Moment distribution method. **[CO-3, L-R]**

e. State the formulae for fixed end moments for a fixed beam AB of span 'L' carrying a udl of w/unit length through out span and a point load 'W' at point C a distance 'a' from end A.
AC = a and CB = b (L = a + b) **[CO-2, L-U]**

Q. 5 Attempt any TWO **12 Marks**

a. i) A cantilever beam ABC is fixed at A, AB=BC=2m. Beam carries point loads of 20kN and 40kN at C and B respectively. Using Macaulay's method, determine slope at C in terms of EI. **[CO-4, L-A]**
ii) State any two types of trusses and their suitability. **[CO-5, L-R]**

b. i) State clapeyron's theorem of three moments. **[CO-2, L-U]**
ii) Find the limit of eccentricity for a rectangular section 3m× 2m. **[CO-1, L-A]**

c. A dam section retains water to a height of 8.5m on its vertical face. The other dimensions of dam & data are : Height =10m, Top width= 3m, Bottom width=6m unit weight of dam masonry = 21kN/m^3
Unit weight of water = 10kN/m^3
Determine the minimum & maximum values of stresses at base. **[CO-1, L-A]**

****End****

EVEN 2025-26

CE23105

GOVERNMENT POLYTECHNIC MUMBAI
TERM END EXAMINATION

Programme : **Civil Engineering (Sandwich Pattern)**
Course Title : **Surveying – II**

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | |

***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

Q.1 Attempt any SIX **12 Marks**

a. State the function of lower plate and vertical circle in theodolite. **[CO-1, L-U]**
b. State any four uses of transit theodolite. **[CO-1, L-U]**
c. Define the terms i) Swinging ii) Face left. **[CO-1, L-R]**
d. Define latitude and departure. **[CO-2, L-R]**
e. State the meaning of balancing of traverse. **[CO-2, L-U]**
f. Define tachometry. **[CO-3, L-R]**
g. Enlist different types of curves. **[CO-4, L-R]**
h. Enlist various advanced surveying equipment. **[CO-5, L-R]**
i. State the components of GIS. **[CO-6, L-U]**

Q.2 Attempt any THREE **12 Marks**

a. Following are the lengths and bearings of a closed traverse. Calculate latitude and departure

Line	AB	BC	CD	DA
Length in (m)	260	240	250	220
Bearing	341°	295°	147°	310°

[CO-2, L-A]

b. i) State the fundamental axes of transit theodolite. **[CO-1, L-R]**
ii) State the difference between open traverse and closed traverse (any two points). **[CO-2, L-U]**
c. A traverse ABCDA is made in the form of square. $\angle A = \angle B = \angle C = \angle D = 90°$. If the bearing of AB is 120°30', find bearing of the other sides. **[CO-2, L-A]**
d. i) State the relation between degree and radius of curve. **[CO-4, L-U]**
ii) State the components of GPS. **[CO-6, L-U]**

Q. 3 Attempt any THREE **12 Marks**

a. Explain the limitations of tachometry. **[CO-3, L-U]**
b. Explain the off sets from long chord method of setting of simple circular curve. **[CO-4, L-U]**
c. State the step by step procedure of determination of area of given map by using digital planimeter. **[CO-5, L-U]**
d. State the various applications of remote sensing in surveying. **[CO-6, L-U]**

Q. 4 Attempt any FOUR **12 Marks**

a. State the errors eliminated by repetition method. **[CO-1, L-U]**

b. State the relationship between fundamental axes of transit theodolite. **[CO-1, L-U]**

c. Explain the principle of tachometry with neat sketch. **[CO-3, L-U]**

d. State the various function keys of total station used for measurement of horizontal distance between two points. **[CO-5, L-A]**

e. Explain the working of LiDAR survey. **[CO-5, L-U]**

Q. 5 Attempt any TWO **12 Marks**

a. Calculate the corrected consecutive co-ordinates for the following observations of traverse.

Line	Length in m	Consecutive co-ordinates	
		Latitude	Departure
AB	695	+654.19	-259.29
BC	937.5	+128.07	+942.99
CD	630	-627.47	+146.54
DA	829.5	-152.48	-831.8

[CO-2, L-A]

b. Determine the values of stadia constants from the following observations.

Inst. Station	Staff Station	Distance	Lower Stadia reading	Upper Stadia readings
	A	300	1.355	2.85
0	B	400	1.1	3.1
	C	500	0.85	3.355

[CO-3, L-A]

c. Two tangents intersects at a chain age of 1190m. the angle of intersection is 145°. Calculate all necessary data for setting out a curve of radius 225m by deflection angle method. Take peg interval of 20m. **[CO-4, L-A]**

****End****

EVEN 2025-26

CE23107

GOVERNMENT POLYTECHNIC MUMBAI
TERM END EXAMINATION

Programme : Civil Engineering (Sandwich Pattern)
Course Title : Repairs & Rehabilitation of Buildings

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | | |

***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

Q.1 Attempt any SIX **12 Marks**

a. Define :- i) Repair ii) Rehabilitation. **[CO-1, L-R]**
b. Define :- Defects. **[CO-1, L-R]**
c. Enlist types of inspection. **[CO-2, L-U]**
d. Enlist classification of failure of structure (any two). **[CO-2, L-U]**
e. Enlist any four repairing materials used for structure. **[CO-3, L-U]**
f. Enlist any four techniques used to reduce the rate of dampness in buildings. **[CO-4, L-U]**
g. Define demolition. **[CO-5, L-R]**
h. Enlist techniques of demolition (any four). **[CO-5, L-U]**
i. Explain reuse of materials from environmental point of view (two points only). **[CO-5, L-U]**

Q.2 Attempt any THREE **12 Marks**

a. Differentiate between routine maintenance & periodical maintenance. **[CO-1, L-U]**
b. Explain in short stages to be followed for the systematic approach of doing damage detection. **[CO-2, L-U]**
c. Suggest any two materials necessary to repair the following
i) Dampness of RCC roof slab.
ii) Dampness in exterior brick wall.
iii) Repairs of 0.4mm wide crack for total depth of a RCC slab.
iv) Concrete surface protection. **[CO-3, L-A]**
d. Explain :- i) Expansive cement. ii) Polymer concrete. **[CO-3, L-U]**

Q. 3 Attempt any THREE **12 Marks**

a. State any four methods used for repair of corroded RCC elements. Explain any one. **[CO-4, L-U]**
b. A brick wall has developed diagonal and other vertical crack, illustrate the suitable repair method. **[CO-4, L-A]**
c. Enlist safety measures to be followed during demolition operation. **[CO-5, L-U]**
d. Explain engineering demolition techniques (any two). **[CO-5, L-U]**

Q. 4 Attempt any FOUR **12 Marks**

a. Define honey combing and also state any one reasons of its occurrence. **[CO-2, L-R,U]**

b. Explain repairs technique underpinning. **[CO-3, L-U]**

c. Explain corrosion resistant steel. **[CO-3, L-U]**

d. State any two reasons of reinforcement corrosion & explain the repair technique of it using rebar. **[CO-4, L-U]**

e. State any three causes of cracks in masonry wall. **[CO-4, L-U]**

Q. 5 Attempt any TWO **12 Marks**

a. State & explain various non-destructive testing (NDT) on concrete. **[CO-2, L-U]**

b. Explain step by step procedure of grouting & gunniting. **[CO-3, L-U]**

c. State any three repairing methods of major cracks & explain them. **[CO-4, L-U]**

****End****

EVEN 2025-26 **AM23105**

GOVERNMENT POLYTECHNIC MUMBAI
TERM END EXAMINATION

Programme : **Civil Engineering (Sandwich Pattern)**
Course Title : **Concrete Technology**

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | | |

***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

Q.1 Attempt any SIX **12 Marks**

a. Define i) Initial setting time (IST) ii) Final setting time (FST) of cement. **[CO-1, L-R]**
b. State Duff Abraham's law for water cement ratio. **[CO-2, L-R]**
c. Define workability of concrete. **[CO-2, L-R]**
d. State the principle of rebound hammer test. **[CO-3, L-U]**
e. Define concrete mix design. **[CO-3, L-R]**
f. Enlist the two points of comparison between volume batching and weight batching. **[CO-4, L-U]**
g. State any two purpose of using retarding admixtures in concrete. **[CO-5, L-U]**
h. State two purposes of using air entraining admixtures in the concrete. **[CO-5, L-U]**
i. Enlist any two precautions to be taken during cold weather concreting. **[CO-5, L-R]**

Q.2 Attempt any THREE **12 Marks**

a. Explain the experimental procedure for the determination of standard consistency of cement. **[CO-2, L-U]**
b. Explain the procedure to determine the crushing value of aggregate. **[CO-1, L-U]**
c. Enlist four requirements of a good form work and draw a sketch showing c/s of formwork for R.C.C beam. **[CO-4, L-R]**
d. Explain fibre reinforced concrete with its properties. **[CO-5, L-R]**

Q. 3 Attempt any THREE **12 Marks**

a. List the properties of five aggregates and explain one of them in detail. **[CO-1, L-R]**
b. Interpret the relationship between the moisture content and the change in volume of fine, medium and coarse aggregate to explain the phenomenon of bulking with relevant sketch. **[CO-1, L-U]**
c. Explain the concept of joining old and new concrete. **[CO-4, L-U]**
d. Explain with sketch pulse velocity method used in testing the concrete. **[CO-3, L-U]**

Q. 4 Attempt any FOUR **12 Marks**

a. Draw the neat labeled sketch of slump cone with all dimensions. **[CO-2, L-U]**

b. Write the procedure of mix design with reference to provision laid in IS10262-2009. **[CO-3, L-R]**

c. Explain the procedure of determination of compressive strength of concrete. **[CO-3, L-U]**

d. Explain curing methodology. **[CO-4, L-R]**

e. Propose the relevant types of formwork for following structures i) Concrete beam ii) Bridge pier iii) Deck slab of a bridge in creek. **[CO-4, L-U]**

Q. 5 Attempt any TWO **12 Marks**

a. Write BIS specifications and field applications of different types of cements. **[CO-1, L-R]**

b. Explain in details all factors which affect the workability of concrete. **[CO-2, L-R]**

c. Explain the effect of HOT weather on setting and hardening properties of concrete. **[CO-5, L-U]**

****End****

EVEN 2025-26 **CE23503**

GOVERNMENT POLYTECHNIC MUMBAI
TERM END EXAMINATION

Programme : Civil Engineering
Course Title : Solid Waste Management

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | |

***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

Q.1 Attempt any SIX **12 Marks**

a. Define Solid Waste. **[CO-1, L-R]**
b. Define E-Waste. **[CO-1, L-R]**
c. State any two importance of segregation of Solid Waste. **[CO-2, L-R]**
d. Draw the sketch of Litter Bin. **[CO-2, L-R]**
e. Define Pyrolysis. **[CO-3, L-R]**
f. State any two advantages of incineration process. **[CO-3, L-R]**
g. Define Bio-Medical waste. **[CO-4, L-R]**
h. Define WTE plant. **[CO-4, L-R]**
i. State any two roles of sweeper. **[CO-2, L-R]**

Q.2 Attempt any THREE **12 Marks**

a. Explain Solid Waste Hierarchy with sketch. **[CO-1, L-U]**
b. State important points of organization pattern of solid waste management for cities having population more than 50 lacs. **[CO-2, L-U]**
c. Enlist any eight factors affecting solid waste generation.. **[CO-2, L-U]**
d. Give any four points where transfer station can be located. **[CO-2, L-A]**

Q. 3 Attempt any THREE **12 Marks**

a. Enlist different systems of collection of solid waste. **[CO-2, L-U]**
b. Explain the role of worms and biomass in Vermicomposting. **[CO-3, L-A]**
c. Explain difference between Bangalore method and Indore method of composting. **[CO-3, L-U]**
d. State any four factors to be considered for site selection of landfills. **[CO-3, L-U]**

Q. 4 Attempt any FOUR **12 Marks**

a. Enlist factors affecting composting. **[CO-3, L-U]**
b. Draw sketch of Area method of landfilling. **[CO-3, L-U]**
c. Explain Bio-reactor landfills. **[CO-3, L-U]**
d. Enlist different sources of E-Waste. **[CO-4, L-U]**
e. Explain how Industrial Waste is hazardous to environment. **[CO-4, L-A]**

Q. 5 Attempt any TWO **12 Marks**

a. Explain Bio-Medical waste management rule, 2016. **[CO-5, L-U]**
b. Explain the role of NGO in Solid Waste Management. **[CO-5, L-A]**
c. Give a note on:
i) Refuse-Derived Fuel (RDF).
ii) Biofuels. **[CO-4, L-U]**

****End****

EVEN 2025-26 **AM23102**

GOVERNMENT POLYTECHNIC MUMBAI
TERM END EXAMINATION

Programme : CE Engineering
Course Title : Mechanics of Structures

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | | |

***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

Q.1 Attempt any SIX **12 Marks**

a. Define moment of inertia and state its unit. **[CO-1, L-R]**
b. State Hook's law along with the expression. **[CO-2, L-U]**
c. Draw stress – strain curve for ductile and brittle material. Show all critical points. **[CO-2, L-U]**
d. Write mathematical expression of M. I. of a triangle about horizontal axis passing through its axes. **[CO-1, L-U]**
e. Define linear strain and lateral strain. **[CO-3, L-R]**
f. Define strain energy. **[CO-3, L-R]**
g. Define shear force and bending moment. **[CO-4, L-R]**
h. State i) Relation between shear force and rate of loading ii) Relation between bending moment and shear force. **[CO-4, L-U]**
i. State the bending equation giving meaning of terms used in it. **[CO-5, L-R]**

Q.2 Attempt any THREE **12 Marks**

a. A timber beam 200 mm wide and 400 mm deep is simply supported over a span of 4 m. It carries a full span uniformly distributed load of 19 KN/m. Find the maximum bending stress induced in the section Draw bending stress distribution diagram . **[CO-5, L-A]**
b. A simply supported beam of span 'L' carries central point load 'W'. Draw shear force and bending moment diagram. **[CO-4, L-U]**
c. A square bar 400 mm^2, 2 m long elongates 1 mm under an axial load of 40 KN modulus of rigidity is 80 GPa. Find the bulk modulus and poission's ratio. **[CO-3, L-A]**
d. Draw stress – strain curve for mild steel and cast iron under tensile loading showing important points. **[CO-, L-]**

Q. 3 Attempt any THREE **12 Marks**

a. A symmetrical I – section of overall depth of 300 mm, has its flanges 150 mm x 10 mm and web 10 mm thick. Find the moment of inertia about its centroidal axis parallel to the flange. **[CO-1, L-A]**

b. A RCC column 300 mm x 300 mm is reinforced with 4 bars of 16 mm diameter. Determine the stresses induced in steel and concrete if it is subjected to an axial load of 450 KN. Take modulus ration = 13.33 **[CO-, L-]**

c. A copper rod 20 mm in diameter is 500 mm long. It is subjected to an axial pull of 2.4 KN applied suddenly. Calculate i) The stress induced in the rod. ii) Elongation and iii) Energy stored in the rod. Take E = 110 GPa. **[CO-3, L-A]**

d. State parallels axis theorem. Draw sketch and explain with the corresponding equation. **[CO-1, L-U]**

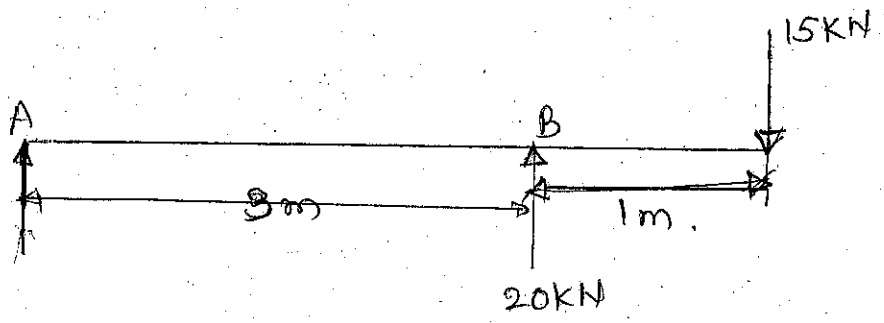
Q. 4 Attempt any FOUR **12 Marks**

a. A cantilever beam AB of span 3m is fixed at 'A', it carries point loads 10 KN and 5 KN at 1.5 m and 3 m from fixed support. Draw shear force and bending moment diagram. **[CO-4, L-A]**

b. State four assumptions made in the theory of Pure bending. **[CO-5, L-U]**

c. A rod 300 mm long and 20 mm in diameter is heated through 100^0c and at the same time pulled by a force P. If the total extension is 0.4 mm. What is the magnitude of P ? E = 2 X 105 N/ mm^2 and $\alpha = 12 \times 10^{-6} / {}^0c$. **[CO-2, L-A]**

d. Write the bending moment equation for the beam is supported and loaded as shown in fig. and draw bending moment diagram. **[CO-4, L-A]**



e. A steel rod 4 m long and 20 mm diameter is subjected to and axial tensile load of 45 KN. Find the change in length and diameter of the rod Es = 2 x105 N/mm^2, Poisson's ratio = $\frac{1}{4}$. **[CO-3, L-A]**

Q. 5 Attempt any TWO **12 Marks**

a. Explain any three types beam and any three types of loading on Beam. **[CO-4, L-U]**

b. A beam has hollow rectangular section with external dimension 80 x 160 mm and uniform thickness of section is 10 mm. Draw shear stress variation diagram if session is subjected to the shear fore 70 KN. Also determine ratio of maximum shear stress and average shear stress. **[CO-5, L-A]**

c. A joist of 5 m span has flanges 250 mm wide x 20 mm thick and web 10 mm thick. The overall depth is 500 mm. It carries a u.d.l. of 20 KN/m over its entire span. Calculate the magnitude of maximum bending stress induced. Sketch the stress distribution diagram. **[CO-5, L-A]**

****End****

EVEN 2025-26 **CE23110**

GOVERNMENT POLYTECHNIC MUMBAI
TERM END EXAMINATION

Programme : Civil Engineering (Sandwich Pattern)
Course Title : Estimating and Costing

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | |

Instructions:
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

Q.1 Attempt any SIX **12 Marks**

a. Define estimating and costing. **[CO-1, L-R]**
b. State any two purpose of estimating. **[CO-1, L-R]**
c. Define approximate estimate. **[CO-2, L-R]**
d. Define (i) Prime cost (ii) Provisional sum. **[CO-3, L-R]**
e. State the two uses of service unit method. **[CO-2, L-R]**
f. Define squaring. **[CO-3, L-R]**
g. State the trapezoidal formula. **[CO-4, L-R]**
h. Define task work. **[CO-5, L-R]**
i. Define lead and lift. **[CO-5, L-R]**

Q.2 Attempt any THREE **12 Marks**

a. State the four purpose of approximate estimate. **[CO-2, L-R]**
b. State the purpose of supplementary estimate. **[CO-1, L-R]**
c. State the modes of measurements for (i) Railing (ii) Barbed wire fencing (iii) Flooring (iv) R.C.C. **[CO-3, L-A]**
d. Describe plinth area method. **[CO-2, L-U]**

Q. 3 Attempt any THREE **12 Marks**

a. Describe the district schedule of rates (DSR). **[CO-1, L-U]**
b. A hospital building of 150 beds is constructed in Mumbai at the cost of construction of Rs. 5 Cr. Find the approximate estimate of small hospital of 35 beds in the similar locality by using service unit method. **[CO-2, L-A]**
c. Calculate the quantities of an item from figure No.01 by using centre line method. Earthwork in excavation in foundation. **[CO-3, L-A]**
d. Calculate quantity from fig.No.1 of PCC in foundation. **[CO-3, L-A]**

Q. 4 Attempt any FOUR **12 Marks**

a. State the term contingencies and work charge establishment. **[CO-3, L-R]**
b. State the necessity of earth work computation. **[CO-4, L-U]**
c. Enlist the methods of calculating earth work. **[CO-4, L-U]**
d. List the data required for rate analysis. **[CO-5, L-U]**
e. State the factors affecting rate of an item. **[CO-5, L-U]**

Q. 5 Attempt any TWO **12 Marks**

a. R.C.C. slab (1:2:4) is to be provided on a room having internal dimensions 4X3.5m, wall thickness 30cm, projection of slab 20cm. Assuming % of steel as 1%. Find the quantity of steel in kg. **[CO-3, L-A]**

b. Calculate quantity of earth work of road **[CO-4, L-A]**

Distance (m)	160	200	240	280	320	360	400
G.L. (m)	50.60	50.70	51.20	51.40	51.30	51.00	50.60

Formation width = 10m, formation RL 51.20 having falling gradient 1 in 40 and side slopes 2:1.

c. Calculate the quantity required for 12mm thick plastering in CM (1:3) for $100m^2$ area. **[CO-5, L-A]**

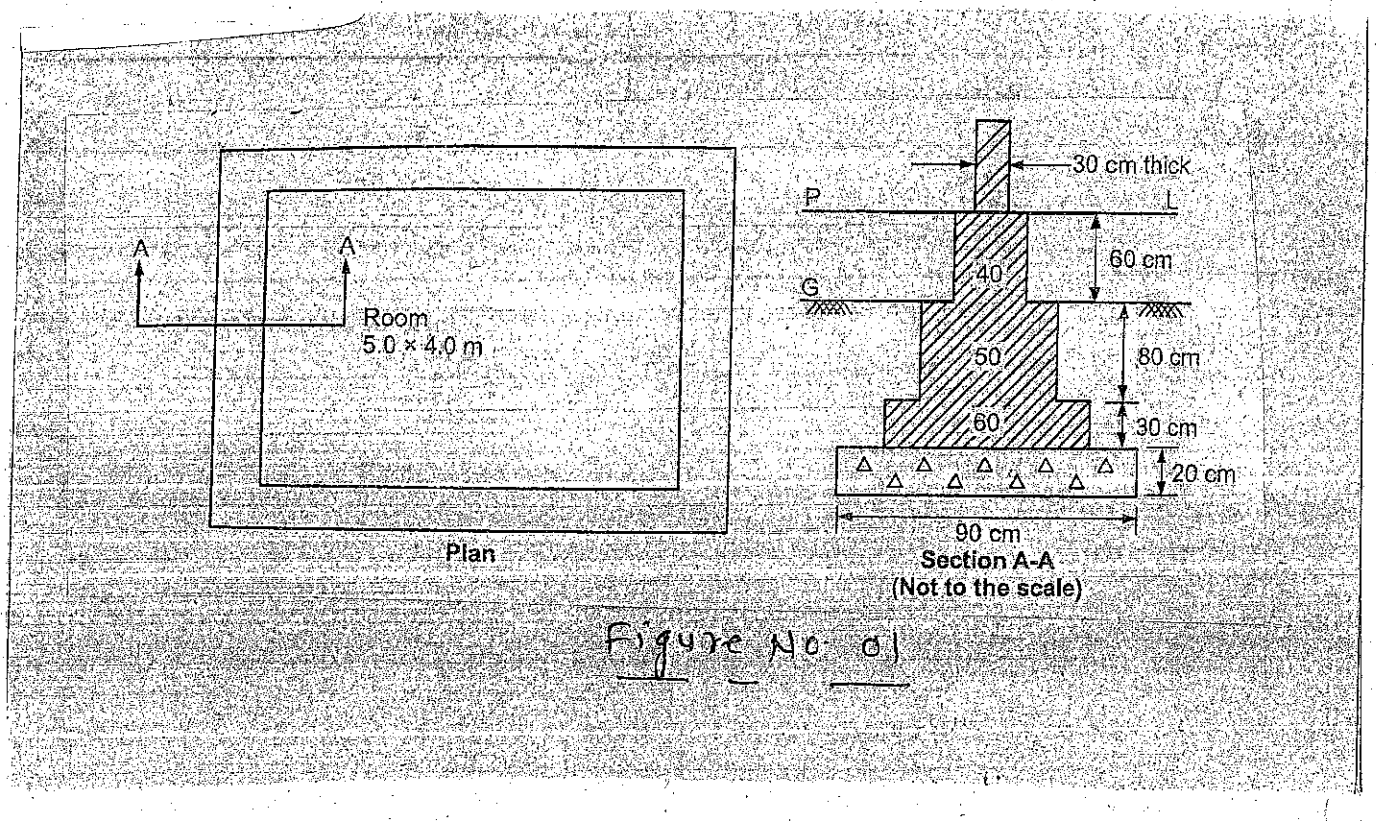


Figure No. 01

****END****

EVEN 2025-26 **AM23103**

GOVERNMENT POLYTECHNIC MUMBAI
TERM END EXAMINATION

Programme : **Civil Engineering (Sandwich Pattern)**
Course Title : **Soil Mechanics**

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | | |

***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

Q.1 Attempt any SIX **12 Marks**

a. Define "Soil" from engineer's point of view. **[CO-1, L-R]**
b. State importance of soil in civil engineer as construction material on any two counts. **[CO-1, L-R]**
c. Explain field application of soil mechanics. **[CO-1, L-U]**
d. Draw soil three phase system. **[CO-2, L-R]**
e. Define : (i) Void ratio (ii) Porosity. **[CO-2, L-R]**
f. Define consistency of soil. **[CO-3, L-R]**
g. Define compaction. **[CO-4, L-R]**
h. Define permeability. **[CO-5, L-R]**
i. What is CBR? **[CO-6, L-U]**

Q.2 Attempt any THREE **12 Marks**

a. State any four difference between compaction & consolidation. **[CO-4, L-U]**
b. State any four factors affecting permeability. **[CO-5, L-U]**
c. Explain ϕ soil and C-soil. **[CO-5, L-A]**
d. Explain plate load test procedure only. **[CO-6, L-A]**

Q. 3 Attempt any THREE **12 Marks**

a. Explain any two methods of field compaction. **[CO-4, L-U]**
b. Explain OMC, zero air void line with the help of a curve. **[CO-4, L-U]**
c. What is Coulomb's equation? Explain direct shear test. **[CO-5, L-A]**
d. State any four factors affecting bearing capacity. **[CO-6, L-U]**

Q. 4 Attempt any FOUR **12 Marks**

a. Explain determination of specific gravity by pycnometer. **[CO-2, L-U]**
b. Explain core cutter method for determination of dry unit weight. **[CO-2, L-U]**
c. Explain mechanical sieve analysis as per IS code. **[CO-3, L-A]**
d. Explain : (i) Liquid limit (ii) Plastic limit (iii) Shrinkage limit. **[CO-3, L-A]**
e. Explain standard penetration test. **[CO-6, L-A]**

Q. 5 Attempt any TWO **12 Marks**

a. Porosity of soil sample is 35% and sp.qr.2.7. Calculate void ratio, dry density, saturated density and submerged density. Take $\gamma_w = 10kN/m^3$. **[CO-2, L-A]**

b. Explain : (i) Uniformity coefficient (ii) Coefficient of curvature (iii) Well graded soil. **[CO-3, L-A]**

c. Explain any three methods of soil stabilization. **[CO-6, L-A]**

****End****

EVEN 2025-26

AM23106

GOVERNMENT POLYTECHNIC MUMBAI
TERM END EXAMINATION

Programme : **Civil Engineering (Sandwich Pattern)**
Course Title : **Design of Reinforced Concrete And Steel Structures**

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | | |

***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

Q.1 Attempt any SIX **12 Marks**

a. Define characteristics strength of a material. **[CO-1, L-R]**
b. What is a "Short column" according to the IS 456:2000 code? **[CO-3, L-R]**
c. Define "Bond" in reinforced concrete members. **[CO-2, L-R]**
d. Write full form of ISLB and ISMB. **[CO-5, L-R]**
e. What is meant by "Net effective area"? **[CO-4, L-R]**
f. What are the partial safety factors for concrete and steel materials in LSM? **[CO-3, L-R]**
g. What is "development length" and why is it important? **[CO-2, L-R]**
h. Define a tension member (or tie member). **[CO-4, L-R]**
i. What does the term "under reinforced beam" mean in LSM? **[CO-1, L-R]**

Q.2 Attempt any THREE **12 Marks**

a. State four benefits when steel is used as a construction material. **[CO-1, L-U]**
b. Calculate the development length for bar in tension & compression if diameter of bar is 16 mm. Use Fe415 & bond stress is 1.2 MPa. **[CO-2, L-A]**
c. Draw sketches of modes of failure in case of members subjected to an axial tension. **[CO-4, L-U]**
d. Explain laterally supported beam with neat sketch. **[CO-5, L-U]**

Q. 3 Attempt any THREE **12 Marks**

a. An ISMB 450 is used as a Simply Supported beam of span 4 m carries 20KN/m load. Check the section for Shear only. **[CO-5, L-A]**
b. Define over reinforced section and state any two reasons due to which they are avoided in actual practice. **[CO-1, L-U]**
c. Calculate the anchorage length of 45° and 90° bend for 20 mm diameter bar. **[CO-2, L-A]**
d. Calculate the area of steel for short circular column of dia. 400 mm with effective length 4.5 m to carry a factored load of 900 KN. Use M20 & Fe500. **[CO-3, L-A]**

Q. 4 Attempt any FOUR **12 Marks**

a. State the factors affecting on development length. **[CO-2, L-U]**

b. What is the difference between short and long column. Write effective length for one end fixed and other end free. **[CO-3, L-U]**

c. Explain the limit state of safety and serviceability applicable to steel structures. **[CO-1, L-U]**

d. What do you understand by Gross area and Net Area? **[CO-4, L-U]**

e. What do you understand by web crippling? **[CO-5, L-U]**

Q. 5 Attempt any TWO **12 Marks**

a. Design a doubly reinforced rectangular beam 300 x 660 mm overall, for an effective span of 5 m. The beam is subjected to udl of 55 KN/m. Assume effective cover 60 mm. Use M20 & Fe415 steel. d'/d = 0.1, fsc = 353 N/mm^2. **[CO-1, L-A]**

b. Calculate working load carrying capacity of column 300 x 450 mm in dimension and provided with 8-16 mm dia. Bars. Use M20 & Fe500 steel. **[CO-3, L-A]**

c. A single angle of 100 x100 x 10 is connected to a 12 mm thick gusset plate with 4 bolts of 18 mm diameter(with pitch of 60 mm & gauge of 40 mm). Determine block shear strength only of given tension member. Take fy= 250 MPa & Fu = 410 MPa. **[CO-4, L-A]**

****End****

EVEN 2025-26 **CE23104**

GOVERNMENT POLYTECHNIC MUMBAI
TERM END EXAMINATION

Programme : **Civil Engineering (Sandwich Pattern)**
Course Title : **Transportation Engineering**

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | |

***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

Q.1 Attempt any SIX **12 Marks**

a. Enlist different modes of transportation. **[CO-1, L-R]**
b. Write different types of metro. **[CO-1, L-R]**
c. Classify different types of roads. **[CO-2, L-R]**
d. Define the terms camber and kerb. **[CO-2, L-R]**
e. Define pavement and write any two types of pavement. **[CO-3, L-R]**
f. Write the classification of Indian railway. **[CO-4, L-R]**
g. Draw the suitable diagram of fish plate. **[CO-4, L-R]**
h. Define cant deficiency. **[CO-5, L-R]**
i. Draw the suitable diagram of diamond-crossing. **[CO-5, L-R]**

Q.2 Attempt any THREE **12 Marks**

a. Explain the different factors affecting road alignment. **[CO-2, L-U]**
b. Explain the procedure of WBM road construction. **[CO-3, L-U]**
c. Write the ideal requirement of permanent way. **[CO-4, L-U]**
d. Explain the scope of water way and airways. **[CO-6, L-A]**

Q. 3 Attempt any THREE **12 Marks**

a. Explain flash and fire point test on bitumen. **[CO-3, L-U]**
b. Define and explain creep of rail. Write their causes. **[CO-4, L-A]**
c. Explain the ideal requirements of railway station. **[CO-5, L-U]**
d. Define sight distance and write different types as per IRC. **[CO-2, L-U]**

Q. 4 Attempt any FOUR **12 Marks**

a. Write the applications of waterway and airways in industrial and agricultural development. **[CO-6, L-U]**
b. Write different types of sleepers and explain their requirement. **[CO-4, L-U]**
c. Explain different factors affecting while selecting site for railway station. **[CO-5, L-U]**
d. Draw cross section of national highway in embankment and cutting. **[CO-2, L-A]**
e. Write the different factors considered while selecting rail gauge. **[CO-4, L-U]**

Q. 5 Attempt any TWO **12 Marks**

a. Explain super-elevation and write the formula for calculating minimum & maximum super elevation. **[CO-2, L-U]**

b. Write a note on track-maintenance. **[CO-5, L-U]**

c. Explain different structural components of pavement and write their functions. **[CO-3, L-U]**

****End****

EVEN 2025-26

CE23312

GOVERNMENT POLYTECHNIC MUMBAI
TERM END EXAMINATION

Programme : Civil Engineering (Sandwich Pattern)
Course Title : Irrigation Engineering

2:30 Hours/ 60 marks Enrolment No. | | | | | | | | | | |

Instructions:
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

Q.1 Attempt any SIX **12 Marks**

a. Define hydrological cycle. **[CO-1, L-R]**
b. Define Delta and Duty of water for crop. **[CO-2, L-R]**
c. Classify dams based on the material of Construction. **[CO-3, L-R]**
d. Define Runoff & Precipitation. **[CO-1, L-R]**
e. Name the two factors that affect the water requirement of crop. **[CO-2, L-R]**
f. What is an Spillways? **[CO-3, L-R]**
g. What do you mean by micro irrigation? **[CO-4, L-R]**
h. Name the two main types of headwork's. **[CO-5, L-R]**
i. List two main component of drip irrigation system. **[CO-4, L-R]**

Q.2 Attempt any THREE **12 Marks**

a. Calculate the maximum flood discharge for catchment area 1500 km^2 using Inglis formula. **[CO-1, L-A]**
b. Distinguish between Drip and sprinkle irrigation. **[CO-4, L-A]**
c. Explain factors affecting Duty. **[CO-2, L-U]**
d. Explain uses of area capacity curve. **[CO-2, L-U]**

Q. 3 Attempt any THREE **12 Marks**

a. Describe ill effects of excessive irrigation. **[CO-1, L-U]**
b. Explain the type of failure of earthen dam with sketch. **[CO-3, L-A]**
c. What are the advantages and disadvantages of Bandhara irrigation? **[CO-2, L-U]**
d. Distinguish between Barrage and Well. **[CO-5, L-A]**

Q. 4 Attempt any FOUR **12 Marks**

a. Explain why spillway is called "safety valve" for dams? **[CO-3, L-U]**
b. Explain the three factors affecting Run-off. **[CO-1, L-U]**
c. Explain crop season with examples. **[CO-2, L-U]**
d. State any three types of material used for canal lining. Also define canal lining. **[CO-5, L-U]**
e. Draw layout of Drip irrigation system. **[CO-4, L-U]**

Q. 5 Attempt any TWO **12 Marks**

a. The Duty of water in a canal for Tobacco crop is estimated as 1400 ha/cumec. First watering was done on 24th Nov, last watering was done on 1st March. Calculate Delta. **[CO-2, L-A]**

b. Explain with sketch the various forces as acting on the gravity dam. **[CO-3, L-U]**

c. What are the different functions of a head work ? Explain with the help of sketch. **[CO-5, L-U]**

****End****

EVEN 2025-26 **CE23101**

GOVERNMENT POLYTECHNIC MUMBAI
TERM END EXAMINATION

Programme : Civil Engineering
Course Title : Building Construction

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | |

***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

Q.1 Attempt any SIX **12 Marks**

a. Enlist the components of building with respect to a load bearing structure. **[CO-1, L-R]**
b. Define job layout. **[CO-2, L-R]**
c. Define timbering and strutting. **[CO-2, L-R]**
d. Define the term facing in hearting. **[CO-3, L-R]**
e. State the importance of frog. **[CO-3, L-U]**
f. State any two functions of doors. **[CO-4, L-U]**
g. State any four types of floor finishes. **[CO-5, L-R]**
h. State the purpose of dado. **[CO-5, L-R,U]**
i. Define roof. **[CO-5, L-R]**

Q.2 Attempt any THREE **12 Marks**

a. Give comparison (four points atleast) between load bearing and framed structure. **[CO-1, L-U]**
b. Write the function of (atleast 2 functions) : (i) Column (ii) Plinth. **[CO-1, L-U]**
c. Explain with a neat sketch raft foundation. **[CO-2, L-U]**
d. Explain with a neat sketch end bearing piles. **[CO-2, L-U]**

Q. 3 Attempt any THREE **12 Marks**

a. Sketch and describe grillage foundation. **[CO-2, L-U]**
b. Explain the requirement of good stone masonary. **[CO-3, L-A]**
c. State the types of pointing and explain any one with a neat sketch. **[CO-5, L-R,U]**
d. List four defects in plastering and describe any one. **[CO-5, L-R,U]**

Q. 4 Attempt any FOUR **12 Marks**

a. Give any three points considered while preparing job layout. **[CO-2, L-U]**
b. Enlist tools and plants used for stone masonary. Draw a neat sketch of any one. **[CO-3, L-R,U]**
c. Compare between stone & brick masonary. (atleast any three points) **[CO-3, L-U]**
d. Explain stretcher bond with a neat sketch. **[CO-3, L-U]**
e. Suggest suitable type of door for (i) Garrage (ii) Main door of residential building. **[CO-4, L-A]**

Q. 5 Attempt any TWO **12 Marks**

a. Draw a neat labelled sketch of staircase with its components. Define the term riser, trade. **[CO-4, L-R,U]**

b. State the various types of windows. Explain any one with a neat sketch. **[CO-4, L-R,U]**

c. Explain and draw a neat sketch of double scaffolding showing its various components. **[CO-5, L-U]**

****End****

EVEN 2025-26 **CE23101**

GOVERNMENT POLYTECHNIC MUMBAI
TERM END EXAMINATION

Programme : Civil Engineering
Course Title : Building Construction

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | | |

***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

Q.1 Attempt any SIX **12 Marks**

a. Enlist the components of building with respect to a load bearing structure. **[CO-1, L-R]**
b. Define job layout. **[CO-2, L-R]**
c. Define timbering and strutting. **[CO-2, L-R]**
d. Define the term facing in hearting. **[CO-3, L-R]**
e. State the importance of frog. **[CO-3, L-U]**
f. State any two functions of doors. **[CO-4, L-U]**
g. State any four types of floor finishes. **[CO-5, L-R]**
h. State the purpose of dado. **[CO-5, L-R,U]**
i. Define roof. **[CO-5, L-R]**

Q.2 Attempt any THREE **12 Marks**

a. Give comparison (four points atleast) between load bearing and framed structure. **[CO-1, L-U]**
b. Write the function of (atleast 2 functions) : (i) Column (ii) Plinth. **[CO-1, L-U]**
c. Explain with a neat sketch raft foundation. **[CO-2, L-U]**
d. Explain with a neat sketch end bearing piles. **[CO-2, L-U]**

Q. 3 Attempt any THREE **12 Marks**

a. Sketch and describe grillage foundation. **[CO-2, L-U]**
b. Explain the requirement of good stone masonary. **[CO-3, L-A]**
c. State the types of pointing and explain any one with a neat sketch. **[CO-5, L-R,U]**
d. List four defects in plastering and describe any one. **[CO-5, L-R,U]**

Q. 4 Attempt any FOUR **12 Marks**

a. Give any three points considered while preparing job layout. **[CO-2, L-U]**
b. Enlist tools and plants used for stone masonary. Draw a neat sketch of any one. **[CO-3, L-R,U]**
c. Compare between stone & brick masonary. (atleast any three points) **[CO-3, L-U]**
d. Explain stretcher bond with a neat sketch. **[CO-3, L-U]**
e. Suggest suitable type of door for (i) Garrage (ii) Main door of residential building. **[CO-4, L-A]**