Roll No. .....

3081

B. Tech. 4th Semester (Civil) Examination – May, 2025

DESIGN OF CONCRETE STRUCTURE

Paper : PCC-CE-204-G

Time : Three Hours] *[Maximum Marks : 75*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* question from each Section. Question No. 1 is ***compulsory***. All questions carry equal marks.

1. Describe the following: $3 \times 5 = 15$

(a) Slenderness ratio

(b) Assumption of limit state

(c) Water cement ratio

(d) Limit state of serviceability

(e) Factor affecting the strength of concrete

SECTION – A

2. Explain the stress-strain relationship of steel and concrete with graphically representation. 15

3. Determine the moment of resistance of a singly reinforced 250mm wide and 350mm deep (effective) beam. The reinforcement consists of 4 bars of 16mm diameter. The material used is M15 concrete and Fe 250steel. Take m=18. 15

SECTION – B

4. (a) Write a short note on steel beam theory. 7.5

(b) A rectangular beam section is reinforced on both side is 350mm wide and having 600mm depth. The centre of steel on both side is 40mm away from respective edges. Determine the steel area on both side for a bending moment of 70KN. Solve by working stress method. 7.5

5. Design a simply supported beam to carry a load of 14500N/m. The clear span of beam is 5.5m. The bearing on each end is 300mm. Assume permissible nominal shear stress as 0.3N/mm^2.Solve it by limit state. 15

SECTION – C

6. Design a RC slab for a room of clear dimension 4mx5m. The slab is supported all around walls of width 300mm. Tha slab has to carry a live load of 4KN/m². Use M20 concrete and Fe415 steel. Assume corner are held down. Sketch the details of reinforcement. 15

7. What are retaining wall ? Explain the types of retaining wall and all specifications as per IS 456:2000 with neat and clean sketch. 15

SECTION – D

8. Design a short axially loaded square column 500mm × 500mm for a service load of 2000KN. Use M20 Concrete and Fe415 steel. 15

9. Write down the design steps of combine raft footings and also explain types of footings. 15

Roll No. .....

3083

B. Tech. 4th Semester (Civil) Examination – May, 2025

GEOMATICS & AERIAL SURVEYING

Paper : PCC-CE-208-G

Time : Three Hours] *[Maximum Marks : 75*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt ***five*** questions in all, selecting ***one*** question from each Section. Question No. 1 is ***compulsory***. Assume missing data if any suitably. All questions carry equal marks.

1. Describe the following :

(a) Selection of triangulation station

(b) Normal equation

(c) Flight planning

(d) Principle of Photo-interpretation

(e) Spatial data analysis

(f) Applications of remote sensing

SECTION – A

2. (a) Two triangulation stations A and B are 130 km apart. The elevation of A is 500 m and that of B is 790 m. An intervening peak is 75 km from A and has an elevation of 392 m. Check the intervisibility from A to B. Find the height of the signal required at B if line of sight is required to pass at least 2.5 m above ground.

(b) What is the principle of trilateration ? Describe the different methods of trilateration with their characteristics.

3. (a) What do you mean by most probable value ? Describe different law of weights to obtain most probable value.

(b) Find the most probable values of angles A, B and C if $A = 46°12'34''$, $B = 22°18'36''$, $A + B = C = 68°31''13''$.

SECTION – B

4. (a) Calculate the hour angle and altitude of the sun at sunset if the latitude is 52° N and declination is 28°30'N.

(b) What are the different time systems ? Describe the different time systems in detail.

5. (a) Describe in detail the Napier's rules of circular parts with its applicability.

(b) Find the azimuth and altitude of a star if latitude = 42° N, hour angle = 19h 30 m, and declination = 22° 15' S.

SECTION – C

6. (a) Derive the parallax equation for determining the height from a pair of vertical photographs.

(b) A vertical photograph was taken at an altitude of 1200 m above mean sea level. Determine the scale of photograph for terrain lying at elevations of 80 m and 300 m if the focal length of camera is 15 m.

7. (a) The scale of a photograph of size 250 × 250 mm is 1/12,000. Determine the number of photographs required to cover an area 250 sq. km if the longitudinal and side overlaps have to be 60% and 30%, respectively.

(b) What are the functions of an aerial camera ? Describe in detail the different components of aerial camera.

SECTION – D

8. (a) What do you mean by polarization of EMR ? Describe in detail the Sources of EMR for remote sensing.

   (b) What are the types of remote sensing ? Describe in detail the systems and components.

9. Write short notes on the following :

   (a) Types of satellite orbits.

   (b) Objectives and components of GIS.

   (c) EMR source and characteristics.

Roll No. .....

3084

B. Tech. 4th Semester (Civil) Examination – May, 2025

MATERIAL TESTING AND EVALUATION

Paper : PCC-CE-210G

Time : Three Hours] *[Maximum Marks : 75*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* question from each Section. Question No. 1 is *compulsory*. All questions carry equal marks.

1. Describe the following : $3 \times 5 = 15$

(a) High Performance Concrete

(b) Prestressed Concrete

(c) Lime

(d) Shrinkage of material

(e) Fatigue of material

SECTION – A

2. (a) Explain the Polymer concrete and fiber-reinforced concrete in detail. 7.5

   (b) Explain the function of Ceramic and Refractories in construction industry. 7.5

3. (a) Explain the different proportioning of mortars for masonry and plastering. 7.5

   (b) Explain the different test used for cement in laboratory. 7.5

SECTION – B

4. (a) Explain the properties of fresh concrete. 7.5

   (b) Explain the durability characteristics of concrete. 7.5

5. (a) Explain the factors considered in the choice of mix design. 7.5

   (b) Explain British mix design method and USBR method for the design of concrete mix. 7.5

SECTION – C

6. (a) Explain the tensile test of steel used in laboratory. 7.5

   (b) Explain the procedure of bending test and torsional test of steel. 7.5

7. (a) Explain the principle and characteristics of elasticity of steel. 7.5

(b) Explain the different types of steel used in civil engineering. 7.5

SECTION – D

8. Explain the impact test and transition temperatures impact during the concrete testing. 15

9. Explain all the steps taken care of during the construction of multistorey building. 15

Roll No. .....

3082

B Tech. 4th Semester (Civil) Examination – May, 2025

STRUCTURAL ANALYSIS

Paper : PCC-CE-206-G

Time : Three hours] *[Maximum Marks : 75*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt any *five* questions, selecting *one* question from each Section. Question No. **1** is ***compulsory***. All questions carry equal marks. Assume missing data, if any suitably.

1. (a) Why is it necessary to compute deflections in structures ? $2.5 \times 6 = 15$

(b) What is the absolute maximum bending moment due to a moving udl longer than the span of a simply supported beam ?

(c) State Eddy's theorem.

(d) State the limitations of slope deflection method.

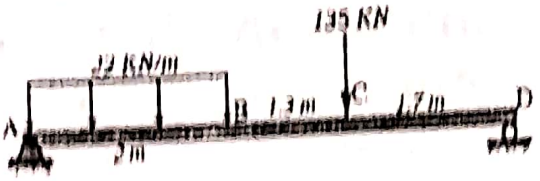
(e) In a member AB, if a moment of –10 KNm is applied at A, what is the moment carried over to B ?

(f) What are the moments induced in a beam member, when one end is given a unit rotation, the other end being fixed. What is the moment at the near end called ?

SECTION – A

2. (a) State the comparison of Castigliono's first theorem and unit load method. 8

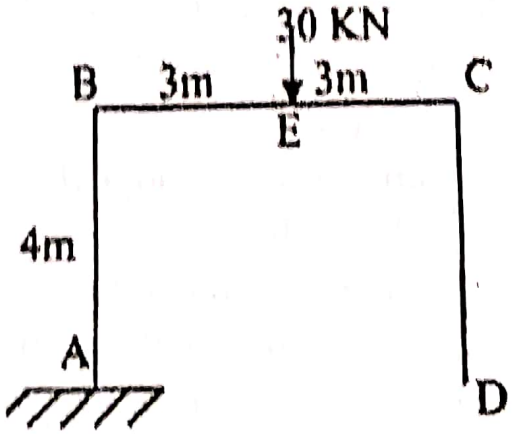
(b) Determine the maximum deflection for the beam shown by double integration method. 7



EI = constant
E = 10.5 GPa
I = 0325 x 10⁶ mm⁴

3. (a) Write down the two methods of determining displacements in pin jointed plane frames by the unit load concept. Explain anyone in detail. 10

(b) The horizontal displacement of the end D of the portal frame is required. Determine the relevant equations due to the unit load at appropriate point. 5



SECTION – B

4. (a) What is the absolute maximum bending moment due to a moving udl longer than the span of a simply supported beam ? 5

(b) With the help of neat sketch explain shear force and bending moment of simply supported beam with a uniformly distributed lead. 10

5. (a) Draw the Influence line diagram for shear force and bending moment for a section at 5m from left support of a simply supported beam, 20m long. Hence calculate the maximum B.M and S.F. at the section. Due to uniformly distributed rolling load of length 8m and intensity 10KN/m run. 10

(b) Where do you have the absolute maximum bending moment in a simply supported beam when a series of wheel loads cross it ? 5

SECTION – C

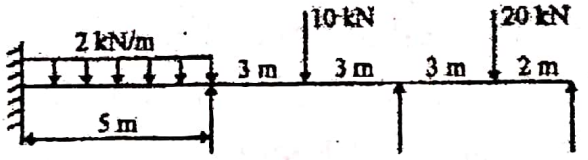
6. (a) A three hinged circular arch of span 16m and rise 4m is subjected to two point loads of 100KN and 80KN at left and right quarter span points respectively. Find the reaction at the supports. Find also BM, radial shear and normal thrust at 6m from the left support. 10

(b) How will you calculate the horizontal thrust in a two hinged parabolic arch if there is a rise in temperature ? 5

7. A suspension bridge of 250 m span has two nos. of three hinged stiffening girders supported by cables with a central dip of 25 m. If 4 point loads of 300 kN each are placed at the centre line of the roadway at 20, 30, 40 and 50 m from left hand hinge. Find the shear force and bending moment in each girder at 62.5 m from each end. Calculate also the maximum tension in the cable. 15

SECTION – D

8. (a) Draw the bending moment diagram and shear force diagram for the continuous beam shown in figure, below using moment distribution method. EI is constant. 10



(b) Explain slope deflection for analysis of continuous beams in detail. 5

9. Analyze the continuous beam by Kani's method. 15

Roll No. .....

3080

B. Tech. 4th Semester (Civil) Examination – May, 2025

HYDRAULIC ENGINEERING

Paper : PCC-CE-202G

Time : Three Hours] *[Maximum Marks : 75*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* question from each Unit. Question No. 1 is *compulsory*. All questions carry equal marks.

1. Explain following terms : $2.5 \times 6 = 15$

(a) What do you understand by laminar flow ?

(b) Momentum Energy correction Factor.

(c) State continuity equation.

(d) Hydraulic gradient line.

(e) What is the function of Pitot tube ?

(f) What is water hammer ?

UNIT – I

2. For the Laminar flow through a circular pipe. Prove that : 15

   (i) Shear stress variation across the section of the pipe is linear

   (ii) Velocity variation is parabolic

3. Obtain an Expression for velocity distribution in turbulent flow for (i) smooth pipe and (ii) Rough Pipes. 15

UNIT – II

4. Find an expression for power transmission through pipes. What is the condition for maximum transmission of power and corresponding efficiency of transmission ? 15

5. Consider all the minor losses and take coefficient of friction is 0.009. Determine the rate of flow of water through a pipe of diameter 20 cm and length 50 m when one end of the pipe is connected to a tank and other end of the pipe is open to atmosphere. The pipe is horizontal and height of water in the tank is 4 m above the centre of pipe. 15

UNIT – III

6. A flow of water of 100 liter per second flows down in a rectangular flume of width 600 mm and having adjustable bottom slope. If Chezy's constant C is 56. find the bottom slope necessary for uniform flow with a depth of flow of 300 mm. Also find the conveyance K of the flume. 15

7. Obtain a relationship between the Froude Numbers of flow before and after the hydraulic jump in horizontal rectangular channel. 15

UNIT – IV

8. A hydraulic jump forms at the downstream end of spillway carrying 17.93 m^3/s discharge. If the depth before jump is 0.08 m determine the depth after the jump and energy loss. 15

9. A pipe through which water is flowing having diameter 40 cm and 20 cm at the cross-sections 1 and 2 respectively. The velocity of water at section I is given 5 m/s. Find the velocity head at the section 1 and 2 and also rate of discharge. 15

B. Tech. 5th Semester, G-Scheme (Civil Engineering)

Examination, December-2025

HIGHWAY ENGINEERING - 1

Paper : PCC-CE-303-G

Time allowed : 3 Hours] *[Maximum marks : 75*

Note : Attempt any **five** full question all question carry equal marks, Assume Suitable Data if not provided use of relevant code is allowed.

1. Write a short note on the following:

(a) Classification of highway. 2.5

(b) Length of transition curve 2.5

(c) Summit and valley curve 2.5

(d) What is the significance of CBR test? 2.5

(e) Subgrade soil and its function 2.5

(f) PIEV theory 2.5

Section-A

2. What is the scope of highway engineering? Explain different road development plans in India. 15

3. What are the various requirement of an idea highway alignment? Also explain factors effecting alignment. 15

Section-B

4. Find the stopping sight distance for a design speed of 55 kmph. Assume suitable data. What are sight distance requirement at a gradient of 1 in 30? Assume suitable data. 15

5. Explain super elevation. What are the factors on which the design of super elevation depends? 15

Section-C

6. What are the different tests on aggregates? Describe any two in detail. 15

7. Explain CBR and the test procedure for laboratory and field test. 15

Section-D

8. Classify the different types of traffic signs and mention the objective of each type of sign with neat sketches. 15

9. What are the different techniques used in intelligent transportation system? Describe in detail. 15

B.Tech. (Civil Engg.) 5th Semester (G-Scheme)
Examination, December–2025

HYDROLOGY & WATER RESOURCE ENGINEERING

Paper– PCC-CE-301-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note: *Attempt five questions in total. **Question No. 1 is compulsory.** Attempt one question from each section. All questions carry equal marks.*

1. (a) Enlist different recording type of rain gauges and explain any one of its type.

(b) Discuss probability of occurrence and non-occurrence of a flood event.

(c) What is a "Return Period"?

(d) Why is base flow separated from total runoff?

(e) Explain the concept of S hydrograph and under what circumstances you would advocate adoption of this hydrography. 5×3=15

Section- A

2. Define Unit Hydrograph. What are the assumptions underlying the Unit Hydrograph theory? Explain uses of Unit Hydrograph. 15

3. The rain gauge station X was in operative for a part of a month during storm occurred. The storm rainfall recorded at the three surrounding stations A, B and C was 75, 55 and 85 mm respectively. If the average annual rainfall of stations A, B, C and X are 780, 660, 850 and 700 mm respectively. Estimate the storm rainfall of station X. 15

Section-B

4. (a) Explain process of infiltration and factor affecting it. 7

(b) What is Infiltration Indices? Explain different types of indices. 8

5. A catchment area of 30 sq. km has one recording gauge. During a storm, the following mass curve of rainfall was recorded. 15

Time from start of storm (Hour)	0	2	4	6	8	10	12	14
Accumulated rainfall (mm)	0	6	17	57	70	81	87	90

If the volume of runoff due to the storm measured is 1.2×10^5 m^3. Estimate the ϕ-index of catchment.

Section-C

6. The effective rainfall hyetograph of a storm has duration of 12 h, with rainfall intensity of 2.0, 0.75, and 4.0 cm/h respectively in successive 4 h periods. The ordinates of the corresponding direct runoff hydrograph read at 4 h intervals are: 15

160,300,570,636,404,234, 105 and 48 m^3/s respectively. Determine the ordinates of the 4 h UHG using deconvolution method. 15

7. Define flood routing. What are the usual assumption made in routing a flood in a reservoir-? Explain the I.S.D. curves method of reservoir flood routing. What are the factors to be considered in choosing the routing period? 15

Section-D

8. Distinguish between: Confined and Unconfined Aquifer, Aquiclude and Aquitard, Specific yield and storage coefficient. 15

9. (a) What is meant by water harvesting? Describe in brief, the rain water harvesting designed for agricultural use, with advantages and disadvantages. 7

(b) What are the causes of drought? What measures you will suggest for water conservation and augmentation? 8

B.Tech. (Civil Engg.) 5th Semester (G-Scheme)
Examination, December–2025

ENGINEERING GEOLOGY

Paper– PCC-CE-311-G

Time allowed : 3 hours] *[Maximum marks : 75*

Before answering the questions, candidate should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note: *Attempt **five** questions in all, selecting **one** question from each section. **Question no. 1 is compulsory.** All question carries equal marks.*

1. Describe the following: 5×3=15

(a) Interior of Earth

(b) Soil Profile

(c) Earthquake

(d) Folds and Faults

(e) Mineralogical composition

Section-A

2. Explain the importance of engineering geology in civil engineering projects. 15

3. Explain the internal and external forces causing changes in the formation of structure. 15

Section-B

4. (a) Explain mineral, rocks and ore. 7.5

   (b) What are the physical properties of mineral used for the identification? 7.5

5. (a) Explain the mineralogy composition. 7.5

   (b) Explain the volcanic phenomenon. 7.5

Section-C

6. (a) Explain the various parts of faults. 7.5

   (b) Explain the folds in detail. 7.5

7. Define stress deformation of rocks and measurement of velocity of sound in rock. 15

Section-D

8. (a) What do you mean by failure of reservoir, and write the causes of failure? 7.5

   (b) Give a broad account of geological conditions that influence the dam site. 7.5

9. What do you mean by seismic waves, and also explain the seismic zones of India? 15

3206

B.Tech (Civil Engg.) 5th Semester (G-Scheme)

Examination, November-2023

ENGINEERING GEOLOGY

Paper-PCC-CE-311-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : *(i)* ***Question no. 1 is compulsory.*** *Attempt one question from each section.*

(ii) *All questions carry equal marks.*

(iii) *Assume missing data, if any, suitably.*

1. Describe the following : 15

(a) Use of geological maps

(b) Weathering

(c) Rock formation of sedimentary rocks

(d) Dip and strike

(e) Metamorphic grades

(f) Measurement of velocity of sound in rocks

(g) Preventive measures to control slides.

Section-A

2. (a) Define engineering geology with its subdivisions. Explain the importance of geology in the planning and execution of civil engineering projects. 7

(b) Describe in brief the crust, the mantle and core of the earth.

3. (a) Explain the external and internal geological forces causing erosion of surface of the earth. 7

(b) Describe the following terms : 8

(i) River meandering

(ii) Loess and mudflows

Section-B

4. (a) What is the mineral and list the physical properties of the minerals with brief description ? 7

(b) Define mineral and rocks. Explain the classification of important rock forming minerals. 8

5. (a) Explain in detail the texture and origin of different types of rocks. 7

(b) What do you mean by volcanoes ? Explain the types of volcanic eruptions and resulting features. 8

Section-C

6. (a) What is structural geology ? Describe in brief the different types of faults with neat diagram. 7

(b) What are the different structures of rocks ? Describe the stresses and strains developed in rocks. 8

7. (a) What are the engineering characteristics of rocks ? Describe the factors affecting the rock properties and its behaviour. 7

(b) What are the different laboratory and field tests on rocks ? Describe briefly. 8

Section-D

8. (a) What are the objectives of a dam ? Describe geological considerations in the selection of a dam site. 7

(b) Describe the concept of sliding. Write down the internal and external causes of landslides. 8

9. (a) Describe the slope reinforcement by rock bolting and rock anchoring. 7

(b) Define magnitude and intensity of earthquake. Also explain the seismic zones in India.

B.Tech (Civil Engg.) 5th Semester (G-Scheme)
Examination, November-2023

DESIGN OF STEEL STRUCTURE

Paper-PCC-CE-309-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : *Attempt any **five** questions in all, selecting **one** question from each unit. **Question no. 1 is compulsory**. All questions carry equal marks.*

1. (a) Define the properties of steel. 6×2.5=15

(b) Define various types of column bases.

(c) What is the purpose for providing anchors bolt in base plate ?

(d) What is slenderness ratio ?

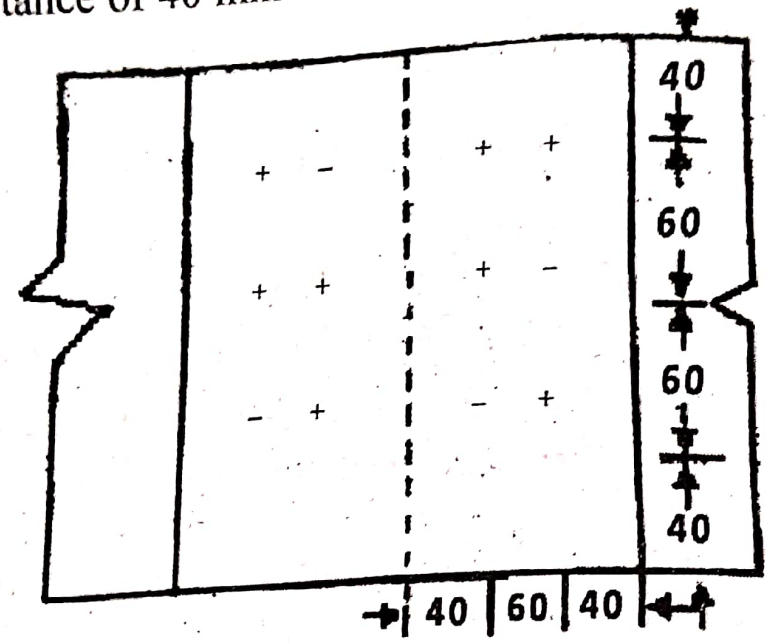
(e) Define diagonal buckling.

(f) Define Lap joint and Butt Joint.

Unit-I

2. Two plates 10 mm and 18 mm thick are to be joined by a double cover butt joint. Assuming cover plates of 6 mm thickness. Evaluate the joint strength and calculate its efficiency. Using M20 boots of grade 4.6

and Fe 410 plates. Assume a pitch of 60 mm and edge distance of 40 mm. 15



3. Define weld. Write about the advantages of welding. List the various types of welded joints. 15

Unit-II

4. A diagonal member of a roof carries a maximum axial pull of 350 KN. Design the section and the connection with a 14 mm gusset plate. The length on the gusset plate available for making the connection is 320 mm. Design the lug angle also if required. The steel is of yield stress of 250 N/mm^2. 15

5. A discontinuous strut of 3 m length between the intersections consists of two angles 110 × 110 × 8 mm. The angles are placed back to back on the opposite

side of the gusset plate and are tack riveted. Calculate the percentage change in the load carrying capacity if the two angles are placed on the same side of the gusset plate. 15

Unit-III

6. A roof of hall measuring 5 × 12 m consists of 120 mm thick RCC slab supported on steel I-section spaced at 3.0 m c/c. Take live load 4.5 KN/m^2 and finishes 2.0 KN/m^2. Bearing of wall 400 mm. The beam is laterally restrained. Design one of the interior beams supporting the roof. Check for shear, moment capacity and deflection. 15

7. A built-up column consists of ISHB 400 @ 77.4 kg/m with one 300 mm × 12 mm flange plate on each side. The column carries an axial load of 2400 KN. Design a gusseted base, if the column is supported on concrete pedestal with a bearing capacity of 4 N/mm^2. 15

Unit-IV

8. A beam of uniform cross-section and span L is built-in at one end and simply supported at the other. It carries a concentrated load at a distance X from the built-in end. Show that the collapse load has the value

$\frac{2L-X}{X(L-X)}M_p$, where M_p is the fully plastic moment. If both the ends have been built-in, show that the load at collapse would have increased in the ratio $\frac{2L}{2L-X}$. 15

9. Design a gantry girder to be used in an industrial building carrying an electric overhead travelling crane, for the following data : 15

Crane capacity	250 KN
Self-weight of the crane girder excluding trolley	200 KN
Self-weight of the trolley, electric motor, hook, etc.	30 KN
Approximate minimum approach of the crane hook to the gantry girder	1.30 m
Wheel base	3.5 m
c/c distance between gantry rails	18 m
c/c distance between columns (span of gantry girder)	8 m
Self-weight of the rail section	400 N/m
Yield stress of steel	250 N/mm^2

3204

B.Tech (Civil Engg) 5th Semester (G-Scheme)

Examination, November-2023

WATER SUPPLY AND TREATMENT

Paper-PCC-CE-307-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : *Attempt any five questions. All questions carry equal marks.* ***Question No. 1 is compulsory.*** *Attempt one question from each section.*

1. (a) Define impurities in water.

(b) List out the standards for water quality.

(c) List out advantages of slow sand filter.

(d) Mention the advantages of chlorine, as disinfectant.

(e) Define Zeolite process.

(f) Name the types of intake according to their position.

(g) Write any two appurtenances in water conveyance system.

(h) List any four effects of hardness in water.

(i) What are the methods of distribution of water ?

(j) What is a surface reservoir ? 10×1.5=15

Section–A

2. The population census of a city is as shown in the following table. Estimate the expected population of the city by 2031 and 2041 using arithmetical increase method and geometrical increase method. 15

Year	1971	1981	1991	2001	2011
Population in lakhs	1.50	1.85	2.18	2.50	2.85

3. Explain all the physical test needed for testing quality of natural river water flowing over an alluvial bed. 15

Section–B

4. (a) Discuss the design aspects of sedimentation tanks in detail. 7

   (b) Describe Chlorination and its types. Explain the various process or methods. 8

5. Show the mechanism of sand filtration. Draw a neat sketch of filter units and explain its working principle. 15

Section–C

6. (a) Explain the factors to be considered in selection of intake structures. 7

(b) Enumerate different types of : 8

(i) Pipe appurtenances

(ii) Pipe materials

7. (a) Explain briefly the steps involved in water supply pipe line installation. 7

(b) Write brief notes on testing of pipelines. 8

Section–D

8. Explain about the analysis of distribution networks in water distribution and supply to buildings. 15

9. (a) Summarize few lines about leak detection and explain its methods. How to maintain the drinking water pipeline system ? 10

(b) What do you mean by economic diameter of a rising main ? 5

B.Tech. (Civil Engineering), 5th Semester (G-Scheme)
Examination, November-2023
HIGHWAY ENGINEERING-I
Paper -PCC-CE-303-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : ***Question no. 1 is compulsory.*** *Attempt total five questions, selecting* ***one*** *question from each unit. All questions carry equal marks.*

1. **Compulsory** question; 5 parts : 15

(a) What are the objectives of CRI?

(b) What is extra widening?

(c) What is the significance of CBR test?

(d) Subgrade soil and its function.

(e) PIEV theory

Unit-I

2. (a) Write any four recommendations of third year 20 plan. 7.5

(b) What is the final Location survey? 7.5

3. (a) The area of a certain district in India is 13,400 sq. km and there are 12 towns as per 1981 census. Determine the lengths of different categories of roads to be provided in this district by the year 2001. 7.5

(b) Compare the construction methods of Telford and Macadam; bring out the point of differences. 7.5

Unit-II

4. (a) If ruling gradient is 1 in 20. What will be the grade compensation and compensated gradient for a curve of radius 150 m. 7.5

(b) Calculate the stopping sight distance of 70 kmph for two way traffic & one way traffic road. Take reaction time 2.5sec & co-efficient of friction = 0.35? 7.5

5. (a) Explain superelevation provided for pavement in curves. Explain the factors influencing it. 7.5

(b) Define sight distance. State its different types and explain SSD. 7.5

Unit-III

6. (a) List and explain the various desirable properties of subgrade soil as highway material. 7.5

(b) Discuss various factors affecting on subgrade soil strength. 7.5

7. (a) List different types of cutback. When are these used? 7.5

(b) How do you find the CBR value in Laboratory? Explain the test procedure with a neat sketch. 7.5

Unit-IV

8. Explain:

(i) Geographic Information Systems 7.5

(ii) Traffic Volume(q) & Traffic Density(k) 7.5

9. (a) What are the different techniques used in an intelligent transportation system? Describe in details. 7.5

(b) Classify the Regulatory Signs, Warning Signs and Informatory signs and mention the objectives with neat sketches. 7.5

B.Tech (Civil Engg) 5th Semester (G-Scheme)
Examination, November-2023

SOIL MECHANICS

Paper-PCC-CE-305-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : *Attempt any **five** questions. All questions carry equal marks. **Question No. 1 is compulsory**. Attempt **one** question from each section.*

1. (a) Discuss Indian standard classification system.

(b) Define Consistency Index.

(c) Write the assumptions taken in Darcy's law.

(d) Define coefficient of volume compressibility.

(e) Describe Triaxial shear test. What are its merits and demerits ? 5×3=15

Section–A

2. (a) An undisturbed specimen of clay was tested in a laboratory and the following results were obtained. Weight =2.1 N, Oven dry weight=1.75 N, Specific Gravity of soil solids=2.7. What was the total volume of original undisturbed specimen assuming that the specimen was 50% saturated ? 10

(b) Derive a relationship between discharge velocity and seepage velocity. 5

3. (a) Discuss Indian standard classification system. 7

(b) What are the factors affecting permeability of soil ? 8

Section–B

4. (a) What is quick sand condition ? Calculate hydraulic gradient for this case. 5

(b) In a soil deposit layer is 10m thick having water table at 5m below the ground surface. There is a capillary zone of 1.5m with degree of saturation 80%. Void ratio is 0.6 and specific gravity s 2.65. Assume soil above the capillary zone to be dry. Draw total, effective and pore pressure distribution diagram. 10

5. (a) Explain the factors affecting rate of compaction of a soil mass. 7

(b) Differentiate between standard and modified compaction text method. 8

Section–C

6. (a) Draw and explain vertical stress distribution diagram below a loaded circular area. 7

   (b) Explain Newmark's influence chart. 8

7. A clay soil, tested in a consolidometer, showed a decrease in void ratio from 1.20 to 1.10 when the pressure was increased from 50 to 100 kPa. If the coefficient of consolidation determined in the test for the given stress increment was 10 m^2/yr, Calculate the coefficient of compressibility and the coefficient of permeability. If the sample tested in the lab was taken from a 2.8m thick clay layer, Determine the consolidation settlement corresponding to the given stress increment. 15

Section–D

8. (a) Explain briefly Vane shear test of soil. 5

   (b) An unconfined compression test was conducted on an undisturbed clay sample. The sample had a diameter of 32 mm. and length 66 mm the load at failure was 30 N and axial compression of the sample was 10 mm. Determine the undrained shear strength parameters if the failure plane makes an angle 46^o with horizontal. 10

9. Draw Mohr–Coulomb failure envelopes of CU, CD and UU tests for sandy soil and comments on the shear strength parameters. 15