Register Number:

Name of the Candidate:

0757

B.E. DEGREE EXAMINATION, 2019

(CIVIL ENGINEERING)

(FIFTH SEMESTER)

(PART-TIME)

PCLEC-501: COMPUTER PROGRAMMING

April /May] [Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL question from each unit **(5 × 15 = 75)**

UNIT – I

1. a) Describe the primary data types and user defined data types in 'C'. (8)
   b) Explain the structure of a C program. What are the advantages and applications of 'C' language? (7)
2. a) Differentiate between signed and unsigned integer. (5)
   b) Explain the purpose of auto and extern storage classes. (5)
   c) Explain any four format string with example. (5)

UNIT – II

3. a) Explain in detail about the various syntaxes that supports decision making process. (8)
   b) Write about the need and types of looping statements in 'C' language. (7)
4. a) With suitable example, describe the structure of if-else statement. (8)
   b) Explain briefly the formatted and unformatted I/O functions in 'C'. (7)

UNIT – III

5. a) What is Recursion? Explain it with suitable 'C' program to calculate the factorial of the number. (8)
   b) Differentiate call by value and call by reference with an example. (7)
6. a) Explain in detail about function prototypes with an illustration. (8)
   b) Using function, calculate the given express in $\frac{x}{y-z}$. (7)

UNIT – IV

7. Write a detailed note on array of pointers. (15)
8. a) Explain in detail how an array can be passed as parameter in a user defined function. (8)
   b) Write a 'C' program to merge two sorted array into a single sorted array. (7)

UNIT – V

9. a) Write a 'C' program to manipulate maximum shear stress if a well in cantilever beam. (8)
   b) How will you calculate transpose of a matrix? Illustrate with an example. (7)
10. a) Calculate torsional stress using a 'C' program when the stress is anti-directional. (7)
    b) How do you calculate the point of contraflexure of beams using a 'C' program. Explain. (8)

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Register Number:

Name of the Candidate:

0308

B.E. DEGREE EXAMINATION, 2019

(CIVIL AND STRUCTURAL ENGINEERING)

(FIFTH SEMESTER)

02PC–501: STRUCTURAL MECHANICS – I

(Common with Civil Engineering)

April /May] [Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL question from each unit **(5 × 15 = 75)**

UNIT – I

1. A beam ABC of uniform EI rest on three simple supports A, B and C initially at the same level. The span AB and BC are each of length 'L'. The span AB is loaded with a load 'W' concentrated at mid-section and the span BC carries the load 'W' uniformly distributed over the entire span. Using Three moment equation analyse the beam and calculate the support reactions. Hence draw the S.F. and B.M. diagram.
2. Find the overhand length of the beam and also draw the B.M. diagram of the shown in the fig.1.

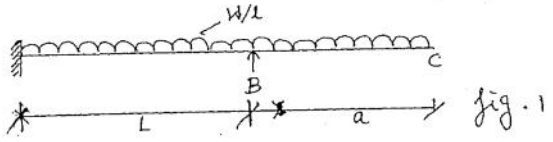


fig. 1

UNIT – II

3. Using Castigliano's theorem find the deflection of the point of application of the force P on the beam of different cross section as shown in fig.2. Assume uniform value of young's modulus and moments of inertia.

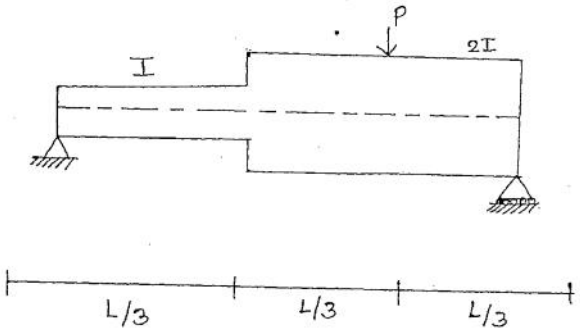


fig. 2

4. Analyse the frame with two pinned support shown in fig 3. Calculate the reactions and draw the B.M. diagram. Assume EI to be same for all members.

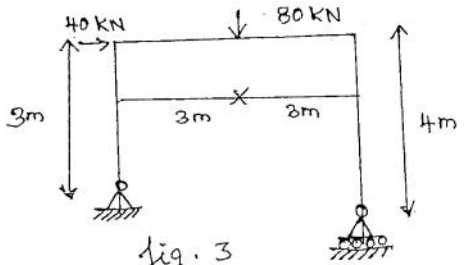


fig. 3

UNIT – III

5. What will be the maximum values of S.F. and B.M. at the section 4 m from the left support? If a moving UDL of intensity 18 kN/m and of length 8 m crosses the beam. Also find the absolute maximum S.F. and B.M. any whole in the span.

6. Find the maximum shear in panel 2-3 in the girder given in fig.4 with the given loading.

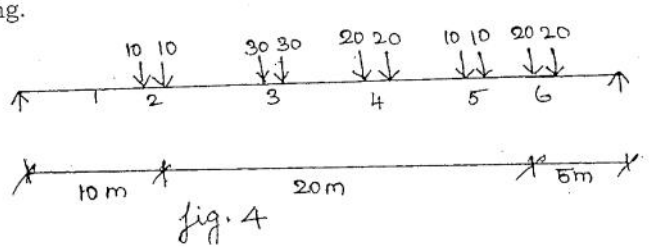


fig. 4

UNIT – IV

7. a) With neat sketch explain crown, springing and Rise.

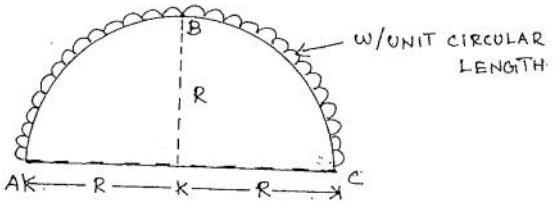
   b) How arches are classified? Explain the boundry condition?

8. A two hinged circular arch rib of uniform section has a span 20 m and a rise of 5 m. Determine the maximum intensity of bending stress in the arch due to rise in temperature of 20°C if the constant depth of the rib is 50 cm $E = 210$ kN/mm^2, coefficient linear expansion = 11×10^{-6}°C.

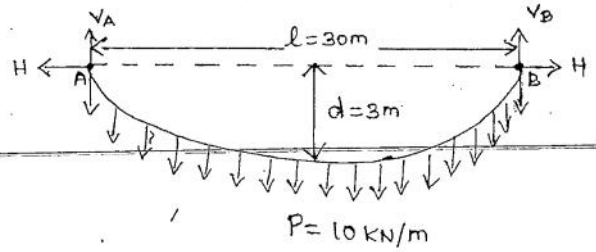
0308

UNIT – V

9. Diagram shows a curved beam, semi-circular in plan and supported on three equally spaced supports. The beam carries a uniformly distributed load of w/unit of the circular length. Analyse the beam and sketch the bending moment and twisting moment diagrams.



10. A suspension cable having supports at the same level, has a span of 30 m and a maximum dip of 3 m. The cable is loaded with a UDL of 10 kN/m throughout its length. Evaluate the maximum tension in the cable.



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Register Number:

Name of the Candidate:

0305

B.E. DEGREE EXAMINATION, 2019

(CIVIL ENGINEERING)

(FIFTH SEMESTER)

01PC–502: SURVEYING – II

April /May] [Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL question from each unit **(5 × 15 = 75)**

UNIT – I

1. a) Discuss various method of traversing. (7)

   b) An instrument was set up at P and the angle of elevation to a vane 4 m above the foot of the staff held at Q was 9° 30'. The horizontal distance between P and Q was known to be 2000 m. Determine the R.L. of the staff station Q. Given the R.L. of the instrument axis was 2650.38. (8)

2. Correct the observed attitude for the height of signal, refraction and curvature from the following data (15)

Observed altitude	= +2° 48'39"	Height of instrument	= 1.12 m
Height of signal	= 4.87 m	Horizontal distance	= 5112 m
Co-efficient of refraction	= 0.07 m	Rsin i"	= 30.88 m.

UNIT – II

3. Derive the expressions for horizontal and vertical distances by fixed hair method when the line of sight is inclined and staff is held vertically. (15)

4. Explain how you would compute the horizontal and vertical distances from the instrument station in the tangential method of tachometry. With the help of a schematic diagram, deduce the equations for the horizontal distance and the vertical distance when both the vertical angles measured are angles of elevation. (15)

UNIT – III

5. A compound railway curve ABC is to have the radius of arc AB = 600 m and that of BC = 400 m. The intersection point V of the straight is located and the intersection angle is observed to be 35° 6'. If the arc AB is to have a length of 200 m, calculate the tangent distance VA and VC. (15)

6. What are the common difficulties in setting out simple curves? Describe briefly the method employed in overcoming them. (15)

UNIT – IV

7. What are the methods of measurement of the base line and explain any two with neat sketch. (15)

8. The following are the observed values of an angle (15)

Angle	Weight
40° 20' 20"	2
40° 20' 18"	2
40° 20' 19"	3

   a) Probable error of single observation of unit weight
   b) Probable error of weight arithmetic mean
   c) Probable error of single observation of weight 3.

UNIT – V

9. The following observations of the sun were taken for azimuth of a line in connection with a survey (15)

   Mean time = 16 h 30 m

   Mean hour angle between sun and referring object = 18°20'30"

   Mean corrected altitude = 33°35'10"

   Declination of the Nautical Almanac = +22°05'36"

   Latitude of the place = 52°30'20"

   Determine the azimuth of the line.

10. a) Explain about Mena solar time and Standard time system. (8)

    b) What is the equation of time? Show that it vanishes four times a year. (7)

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Register Number:

Name of the Candidate:

0365

B.E. DEGREE EXAMINATION, 2019

(CIVIL ENGINEERING)

(FIFTH SEMESTER)

CLEC–502/PCLEC–102: SURVEYING – II

April /May] [Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL question from each unit **(5 × 15 = 75)**

UNIT – I

1. A vane 3 m above the foot of a staff was sighted at a point 1200 m away from the instrument. The observed vertical angle was 1° 30'. The reduced level of the instrument station was 250.50 m and the height of the instrument axis is 1.5 m. Find the reduced level of the staff station. Apply the combined correction for curvature and refraction in finding the R.L. of the station. (15)

2. A tachometer was set up at station A and the following readings were obtained on a vertically held staff (15)

Inst station	Staff station	Vertical angle	Stadia hair readings (m)	Remarks
A	B.M	- 02°18	3.225, 3.550, 3.875	RL of B.M = 425.515 m
A	B	+8°36'	1.650, 2.515, 3.380	

UNIT – II

3. a) What is meant by 'shift' of a curve derive an expression for the same. (7)
   b) Explain the various methods of a transition curve. (8)
4. Write in detail about tachometric survey and its classification. (15)

UNIT – III

5. Briefly explain the following: (i) Satellite stations (7)
   (ii) Phase of a signal (8)
6. From a satellite station S, 5.8 m from main triangulation station A, the following directions were measured. A = 0°0'0"; B = 132°18'30"; C = 232°24'06"; D = 296°06'11"; AB = 3265.5 m; AC = 4020.2 m; AD = 3086.4 m. determine the directions of AB, AC and AD. (15)

UNIT – IV

7. a) Explain the laws of accidental errors. (7)
   b) Explain the laws of weight. (8)
8. a) Explain the general principles of least squares. (7)
   b) Give the general rules for the adjustments of a geodetic triangle. (8)

UNIT – V

9. Write short notes on: (i) Great and small circle (ii) Poles (iii) Axis. (15)
10. Give the procedure to calculate the arc length of a great circle. (15)

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Register Number:

Name of the Candidate:

0310

B.E. DEGREE EXAMINATION, 2019

(CIVIL AND STRUCTURAL ENGINEERING)

(FIFTH SEMESTER)

02PC–503: SOIL MECHANICS

(Common with Civil Engineering)

April /May] [Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL question from each unit

UNIT – I

1. a) A field density test was conducted by core cuter method and the following data were obtained. Weight of the empty core cutter=2280gm weight of soil and core cutter=4950gm, Inside diameter of core culler=90mm, height of core cutter=180mm. Weight of wet soil sample for moisture content determination=54.05 gms. Weight of oven dried soil sample =51.12 gm, specific gravity of soil grains=2.72. Determine dry density void ratio degree of saturation. (10)

   b) (i) Explain the soil classification system. (5)

   (ii) Two clay samples A and B have the following properties.

Atterberg limits	Clay A	Clay B
Liquid limit	44%	55%
Plastic limit	29%	35%
Natural water content	30%	50%

Which of the clays A or B would experience larger settlement under identical loads? Conclude with your comments.

UNIT – II

2. a) Describe in detail with neat sketches, the laboratory determination of permeability using constant head method and falling heat method. (15)

   b) (i) The water table in a deposit of sand 8m thick is at a depth of 3m below the ground surface. Above the water table, the sand is saturated with capillary water. The bulk density of sand is 19.6kN/m^3. Calculate the effective pressure at 1m. 3m and 8m below the ground surface. Hence plot the variation of total pressure, neutral pressure and effective pressure over the depth of 8m. (12)

   (ii) What is meant by capillary rise in soil and how it affects the stress level in soils? (3)

UNIT – III

3. a) (i) Define isobar. (2)

   (ii) A concentrated point load of 200kN acts at the ground surface. Find the intensity of vertical pressure at a depth of 10m below the ground surface and situated on the axis of the loading. What will be the vertical pressure at a point at a depth of 5m and at a radial distance of 2m from the axis of loading? Use Boussinesq analysis. (13)

   b) Briefly discuss about the construction of Newmarks chart and write their applications. (15)

UNIT – IV

4. a) (i) Explain the shear strength paraemeters. (5)

(ii) The following data were obtained in a direct sheartest. Normal pressure =20kN/m², Tangential pressure=16kN/m², Angle o internal friction=20°, Cohesin=8kN/m². Represent the data. (10)

b) A cylindrical specimen of dry sand was tested in a triaxial test. Failure occurred a cell pressure of 1.2kg/cm² and at a deviator stress of 4.0kg/cm². Find (i) Normal and shear stresses on the failure plane. (ii) The maximum shear stress on any plane in the specimen at the instant of failure. (15)

UNIT – V

5. a) (i) Differentiate between finite slope and infinite slope. (3)

(ii) Demonstrate in detail with neat sketches the Bishop's method of stability analysis. (12)

b) (i) Name the different types of slope failure? (3)

(ii) A slope of very large extent of soil with properties $c'=0$ and $\phi=32''$ is likely to be subjected to seepage parallel to the slope with water level at the surface. Determine the maximum angle of slope with water level at the surface. Determine the maximum angle of slope for a FOS is 1.5 treating it as an infinite slope. For this angle of slope what will be the FOS if the water level were to come down well before the surface? The saturated unit weight of the soil is 20kN/m³. (12)

Register Number:

Name of the Candidate:

0366

B.E. DEGREE EXAMINATION, 2019

(CIVIL ENGINEERING)

(FIFTH SEMESTER)

CLEC–503/PCLEC–105: STRUCTURAL MECHANICS – I

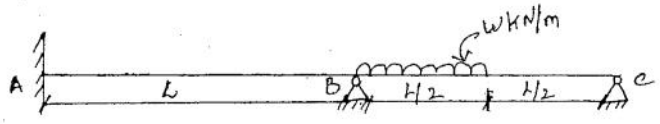
April /May] [Time : 3 Hours

Maximum : 75 Marks

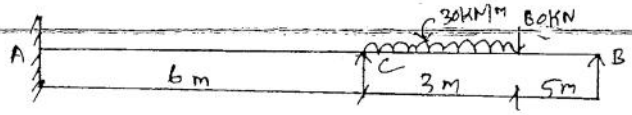
Answer any ONE FULL question from each unit **(5 × 15 = 75)**

UNIT – I

1. A Continuous beam ABC is loaded as shown in figure. Determine the reaction, and sketch the shear force and bending moment diagrams.

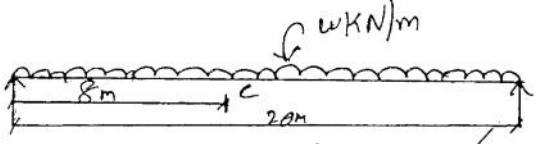


2. Draw the shear force and bending moment diagrams for the beam given below.

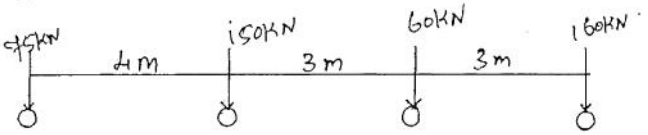


UNIT – II

3. Determine the shear and moment at Point C on the beam of the figure shown below subjected to a uniformly distributed load.



4. Determine the maximum shear at a point 8 m from the left support for a 20 m span of a simple beam with a series of loads as shown figure.



UNIT – III

5. Find out the thrust in a two hinged parabolic arch of rise 10 m and span 60 m subjected to a UDL of 25 kN/m. The moment of inertia at the crown section is $1.14 \times 10^{-3} m^4$ and the area of the cross section is $6.75 \times 10^{-2} m^2$. Write the bending moment expression at the section at a distance x from the crown and determine the bending moment at the crown.

6. A symmetrical three-hinged circular arch of span 20 m and rise 5 m with supports at same level carries a concentrated load of 100 kN at 6 m from the left support. Find the (i) thrust and vertical reactions at springing, (ii) internal forces at 5 m from the right support and (iii) maximum positive and negative moments.

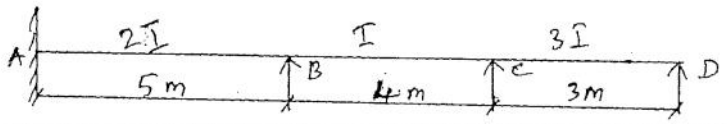
UNIT – IV

7. A cable is used to support three loads of 25 kN, 20 kN and 40 kN, respectively. The cable is tied at its end to two pegs at the same level and 50 m apart. The loads divide the distance between the pegs in four equal parts. If the length of the cable is 55 m, find the shape of the cable and the tension in its different segments.

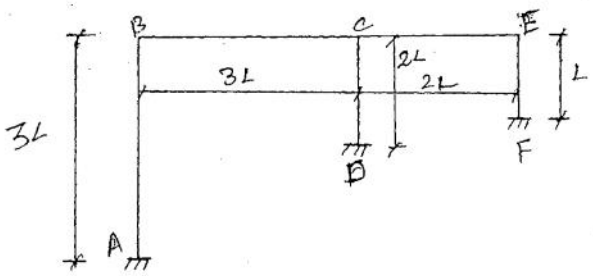
8. The two parts of a three-hinged stiffening girder of a suspension bridge are 200 m and 150 m long, respectively. Find the position and magnitude of the maximum bending moment due to a UDL of W kN/m for 75 m on both sides of the central hinge.

UNIT – V

9. By moment distribution method determine the end moments in the continuous beam as shown in figure.



10. Analyses the frame shown in figure by moment distribution method.



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Register Number:

Name of the Candidate:

0367

B.E. DEGREE EXAMINATION, 2019

(CIVIL ENGINEERING)

(FIFTH SEMESTER)

CLEC–504/PCLEC-302: SOIL MECHANICS

April /May] [Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL question from each unit

UNIT – I

1. A soil sample has porosity of 40%. The specific gravity of soil is 2.70. Calculate (a) voids ratio (b) dry density (c) unit weight if the soil is 50% saturated and (d) unit weight if the soil is completely saturated.
2. What is compaction? What are the field compaction methods? Explain in detail the factors affecting the compaction.

UNIT – II

3. The water table in a deposit of sand 8m thick is at a depth of 3m below the surface. Above the water table the sand is saturated with capillary water. The bulk density of sand is 19.62KN/m^3. Calculate the effective pressure at 1m, 3m and 8m below the surface. Hence plot the variation of total pressure, neutral pressure and effective pressure over the depth of 8m.
4. What is permeability? What are the laboratory methods to determine the coefficient of permeability and derive the expression to determine the permeability?

UNIT – III

5. Explain the Boussinesq equation for the vertical pressure under a uniformly loaded circular area.
6. List the various assumptions made in Terzaghi's theory of one dimensional consolidation and derive the Terzaghi's one dimensional consolidation equation.

UNIT – IV

7. A standard specimen of cohesion less sand was tested in triaxial compression and the sample failed at a deviator stress of 482 KN/m^2, when the cell pressure was 100KN/m^2, under drained condition. Find the effective angle of shearing resistance of sand. What would be the deviator stress and the major principal stress at failure for another identical specimen of sand if it is tested under a cell pressure of 200KN/m^2?
8. What are the methods to measure the shear strength? Explain the measurement of shear strength by vane shear test.

UNIT – V

9. What are the two types of slopes? Explain the stability analysis of infinite slope in cohesion less soil.
10. Explain with neat sketches the Friction circle method of stability analysis.

Register Number:

Name of the Candidate:

0306

B.E. DEGREE EXAMINATION, 2019

(CIVIL AND STRUCTURAL ENGINEERING)

(FIFTH SEMESTER)

02PC–504: STRUCTURAL CONCRETE DESIGN-II

April /May] [Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL question from each unit
Relevant IS codes are permitted IS,456
SP 34: 1987 is permitted

UNIT – I

1. A portal frame with ends hinged is to be analysed for the following data: spacing of portal frames-4m, height of columns-4.5m. Distance b/w column centres=9m, L.load on the roof=1.5kN/m². RCC slab is provided over the portal frames. Analyse the portal frame and find design moments.
2. Explain in detail about substitute frame method for gravity loads.

UNIT – II

3. What is circumstances do you select the depth of footing? What critical section in a footing do you check for safety against shear?
4. Neat sketch the details of a typical raft foundation connecting 16 reinforced concrete columns spaced 4m apart arranged in a square grid. Explain the design procedure of raft foundation.

UNIT – III

5. What are the salient points to be followed in the structural design of a pile? What are the code specifications regarding the longitudinal and lateral reinforcement?
6. A RC column 500mm by 500mm carrying a load of 750kN is supported on 3 piles 300mm by 300mm in section. The centre to centre distance between piles is 1500mm. Design the pile cap. Use M20 grade and Fe415 grade steel.

UNIT – IV

7. Design a flat bottom circular elevated water tank of dia 10m and total height of 4m which is to be supported by ring beam 7.5mm dia. The ring beam is to be supported by six columns equally placed. Use M25 concrete and Fe415 steel. Design the top dome.
8. Design a circular water tank of capacity 2,50,000 litres of total height 4.2m, which will be resting on firm ground, if joint between the wall and tank is fixed.

UNIT – V

9. What is the effect of surcharge in the design of retaining walls? Explain the sources developing surcharge forces?
10. Design the stem of a cantilever retaining wall for following data: Height of the wall above ground=3m, Depth of foundation=1m, Safe bearing capacity of soil =120kN/m², Angle of friction of soil=25°. Take μ=0.44, unit weight of earth=16kN/m³.

Register Number:

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0307

B.E. DEGREE EXAMINATION, 2019

(CIVIL ENGINEERING)

(FIFTH SEMESTER)

01PE–505: HYDROLOGY

April /May] [Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL question from each unit **(5 × 15 = 75)**

UNIT – I

1. Discuss the constituents and structure of atmosphere in detail. (15)

2. a) Discuss the scope and applications of hydrology in civil engineering. (8)

   b) Explain about climate and weather seasons in India. (7)

UNIT – II

3. Explain how do you estimate the missing rainfall data of a region. (15)

4. A storm commenced at 8.00 am. The ordinates of the rainfall mass curve of this storm in mm by a recording rain gauge at 15 minutes intervals are 0, 9.5, 17, 27, 40.5, 49, 63, 84, 95, 102, 110, 112 and 112. Calculate the maximum rainfall intensities for durations 15, 30, 45, 60, 90, 120 and 180 minutes and plot the intensity duration graph. (15)

UNIT – III

5. a) Explain the various factors affecting the evapotranspiration. (8)

   b) Discuss the methods for estimation of evaporation of a place. (7)

6. Explain in detail by any one method for determining the evapotranspiration. (15)

UNIT – IV

7. a) Explain the method of separation of base flow from the surface runoff. (7)

   b) Explain how do you measure the stream flow and also write about flow mass curve. (8)

8. a) What is runoff? Discuss the components of runoff. (8)

   b) The ordinates of 4 hour unit hydrograph of a basin of area 300km^2, measured at 1 hour interval are 6, 36, 66, 91, 106, 93, 79, 68, 58, 49, 41, 34, 27, 23, 17, 13, 9, 6, 3 and 1.5m^3/s respectively. Obtain the ordinates of a 3 hour unit hydrograph for the basin using the S-curve technique.

UNIT – V

9. a) Explain the Muskingam method of flood rooting in detail. (8)

   b) Explain about the types of droughts and drought indices. (7)

10. a) Route the flood hydrograph given below through a channel reach and derive the out flow hydrograph. The values of K and x for the reach may be taken as 12 hours and 0.278 resp. (9)

Time(hour)	0	4	8	12	16	20	24	28
Flow (m^3/s)	42	68	116	164	194	200	192	170

Time(hour)	32	36	40	44	48	52	56
Flow (m^3/s)	150	128	106	88	7	62	54

   b) Differentiate between the hydraulic routing and hydrological routing. (6)

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Register Number:

Name of the Candidate:

0369

B.E. DEGREE EXAMINATION, 2019

(CIVIL ENGINEERING)

(FIFTH SEMESTER)

CLEC–505: STRUCTURAL ENGINEERING-II

April /May] [Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL question from each unit
(use of relevant codes books are permitted)

UNIT – I

1. Compare the WSM and LSM of design.
2. A four storey building frame has four equal bays of 4m each and the height between floors is 4m. The wind load acting at roof level and various floor levels are H_1=5 kN, H_2=10 kN, H_3=10 kN and H_4=10 kN. The columns have the same cross section. Estimate the moments in the columns and beams using (a) portal frame method.

UNIT – II

3. Design a reinforced concrete cantilever type retaining wall, having a 5m full stem. The wall retains the soil with its top. The soil weighs 18kN/m^3, and has an angle of repose 30°. The SBC of soil is 200kN/m^2. Use M20 grade and Fe415 grades.
4. Design a counter fort type retaining wall for the following data:

Height of the wall above the ground level	=8m
SBC of the soil	=180kN/m^2
Angle of friction	=35°
Density of soil	=18kN/m^3
Spacing of counter fort	=5mc/c

Use M20 grade concrete and Fe415 grade steel.

UNIT – III

5. Design a rectangular RC water tank resting on the ground for a capacity of 8,00,000 litres. Design also the side walls of the tank using the following data: Dimension of tank=7m×5m. use M20 grade concrete and Fe415 steel. Assume necessary datas.
6. The bottom slab of an overhead water tank is indealized as a circular slab of 8.25m effective diameter. The depth of water tank is 5m and self weight of the slab is 3kN/m^2. The boundary conditions of slab may be assumed to be partially restrained at the edges. Design the slab.

UNIT – IV

7. Design a rectangular deck slab 5m×4m in size and simply supported at the edges to support a liveload of 4kN/m^2. Assume co-efficient of orthotrophy as 0.7. Use M20 and Fe415 Grade of concrete and steels respectively.
8. Explain the Design procedure for a solid slab bridge design.

UNIT – V

9. a) Write short notes on loads on roof trusses. (7)
   b) Write the design procedure for Purlin. (8)
10. What are the types of industrial buildings? Explain the elements of the industrial buildings.

Register Number:

Name of the Candidate:

0370

B.E. DEGREE EXAMINATION, 2019

(CIVIL ENGINEERING)

(FIFTH SEMESTER)

CLEC–506: TRANSPORTATION ENGINEERING – II

(Old Regulations)

(Common with Part Time)

April /May] [Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL question from each unit **(5 × 15 = 75)**

UNIT – I

1. Briefly outline the development of Indian Railways.
2. Explain necessity of maintaining the railway track. List out the various items of maintenance.

UNIT – II

3. Draw a neat sketch of a left hand turnout and show various parts on it.
4. Define a railway station and discuss in its important essentials features.

UNIT – III

5. List out the methods of tunneling in soft strata. Sketch and explain in details about fore poling method.
6. Discuss the "well point" and "Gathering pump" methods of drainage.

UNIT – IV

7. What is hydrographic survey? Briefly describe the planning techniques for costal harbour survey.
8. Classify the different types of breakwater. Under what condition a rubble mound breakwater is preferred. Briefly describe the various methods of mound construction.

UNIT – V

9. Define dredging. Explain the reasons for its adaptation. How it is dredged materials disposed off?
10. Briefly describe the design principles of wet docks. How a wet dock differs from a tidal basin?

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