**Hall Ticket No :** **Question Paper Code :**

**ANIL NEERUKONDA INSTITUTE OF TECHNOLOGY & SCIENCES**
**(AUTONOMOUS)**
III/IV B. Tech II- Semester Regular Examinations April - 2018
**ESTIMATION & COSTING**
**(CIVIL)**

**Time: 3 hours** **Max Marks: 60**

**Answer ONE Question from each Unit**
**All Questions Carry Equal Marks**
**All parts of the question must be answered in one place only**

## UNIT-I

1. (a) Explain in brief about contingencies (**4M**)
   (b) Write about plinth area, floor area, carpet area and circulation area. (**4M**)
   (c) Mention various errors in estimation. (**4M**)

**(OR)**

2. (a) Explain in detail the different types of estimate. (**6M**)
   (b) Write about various rules and methods of measurements of different works (**6M**)

## UNIT-II

3. Write a detailed specification for the following items of works:
   (a) RCC 1:2:4 for roof slab
   (b) Plastering the walls inside with cm 1:5
   (c) Painting of wood work (**12M**)

(**OR**)

4. Write detailed specification for the following items of works.
   (a) Earth work in excavation
   (b) Damp proof course
   (c) $1^{st}$ class brick work in CM(1:6) (**12M**)

## UNIT-III

5. Work out the unit rates for the following item of works.
   (a) Cement Concrete (1:4:8)
   (b) Brick work in CM(1:4)
   (c) 20 mm thick plastering in CM(1:5) (**12M**)

(**OR**)

6. Work out the unit rates for the following item of works.
   (a) Cement concrete (1:4:8) in foundation
   (b) Coarsed rubble stone masonry in cm (1:6)
   (c) Plastering of walls in cm (1:4) 12 mm thick. (**12M**)

## UNIT-IV

7. The plan and sectional details of walls and roof slab is shown in figure 1. If the dimensions of rooms are clear and inner dimensions, estimate
   (a) Amount of earthwork excavation to be done for the foundation trenches
   (b) Inside area for white washing. (**12M**)

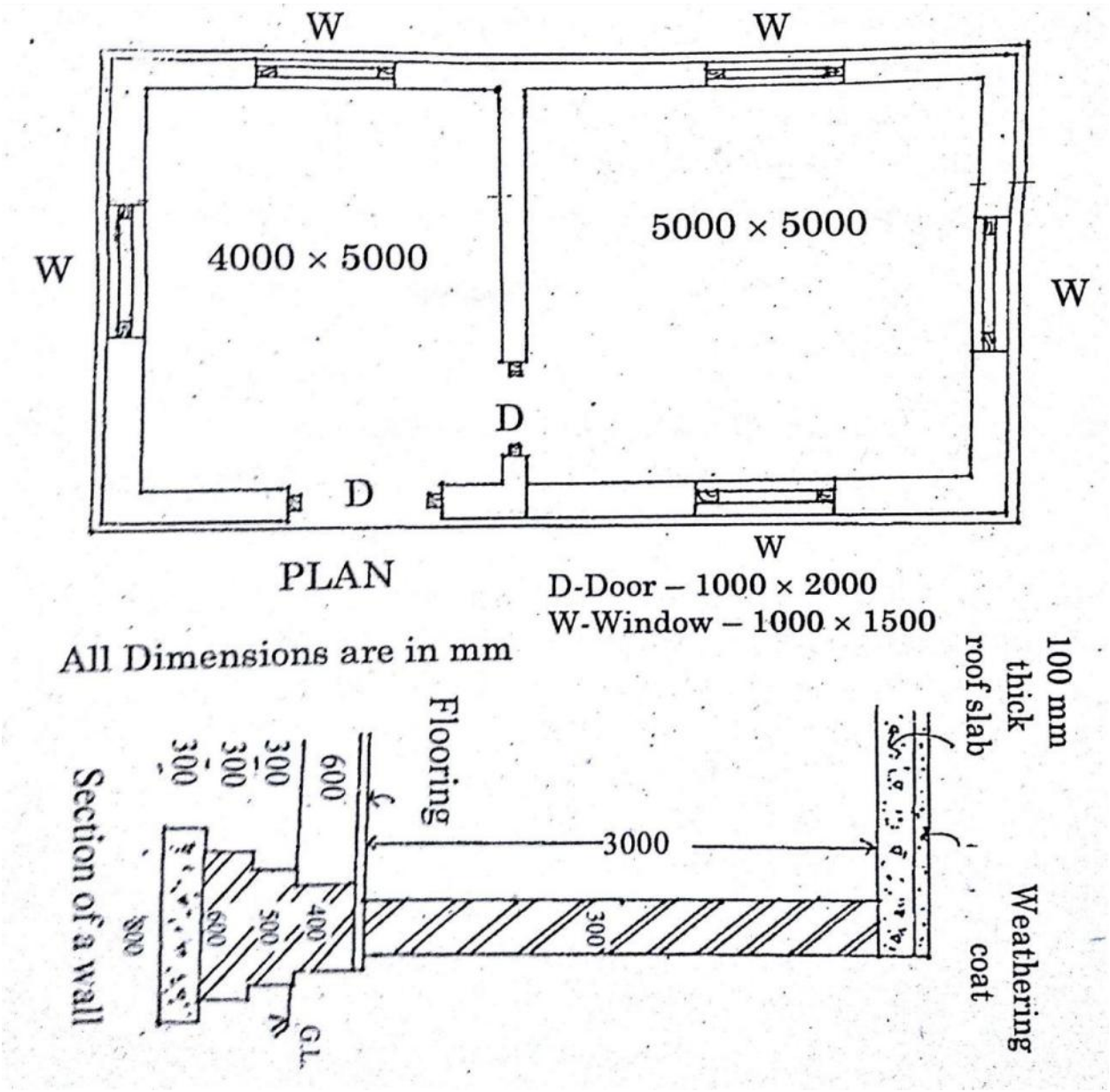


Figure 1

**(OR)**

8. Estimate the quantities of the following items of a two roomed building from the given plan and section as shown in figure 2.

(a) Lime concrete foundation

(b) 1st class brick work in lime mortar in super structure. **(12M)**

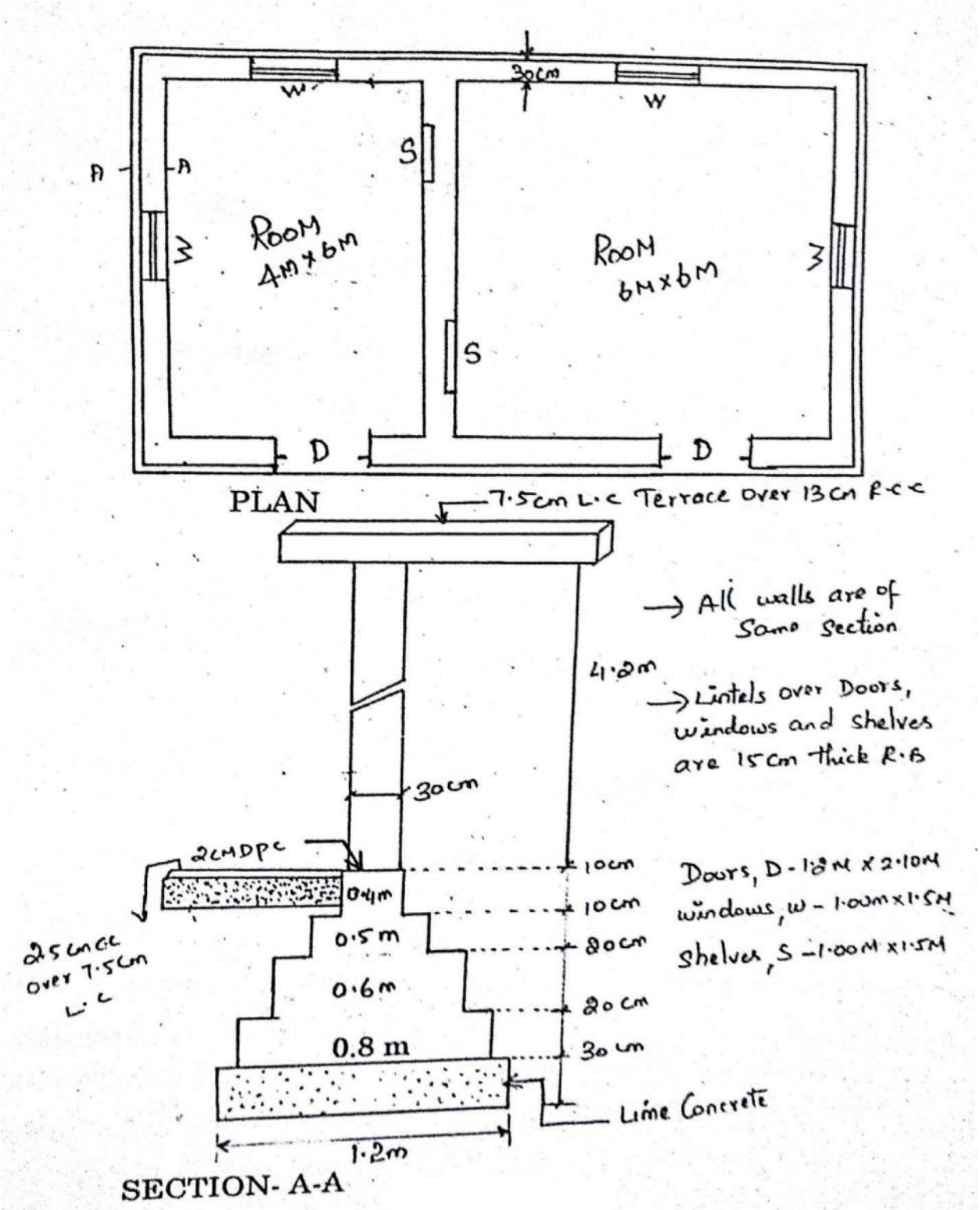

Figure 2

## UNIT-V

9. Figure 3 shows the longitudinal section and cross section of a simple beam of clear span 5 m.The thickness of the supporting wall is 30 cm. Prepare bill of quantities of the beam. Also prepare a schedule of bars. (**12M**)

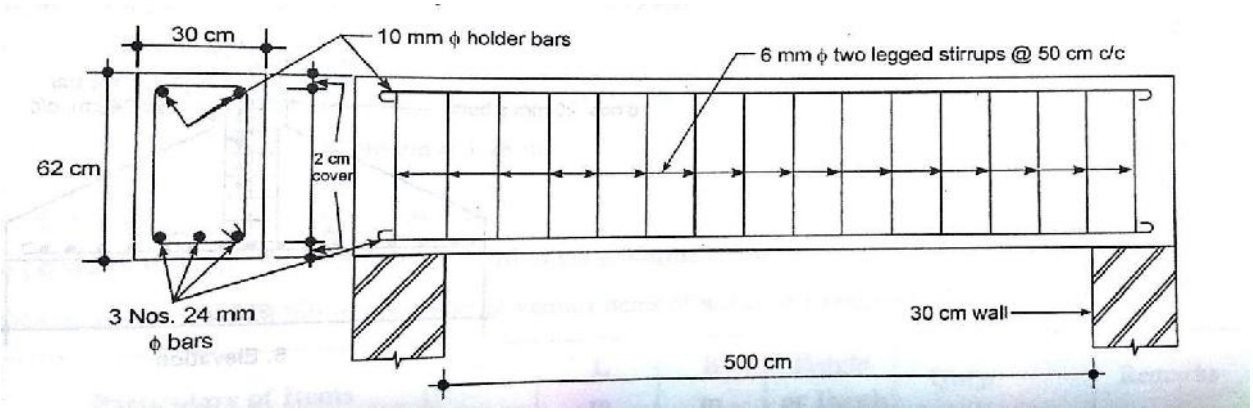


Figure 3

**(OR)**

10. Figure 4 shows the section along the shorter span of a room of size 4 x 5.5 m (internal dimension). The thickness of the slab is 13 cm. The thickness of the walls is 40 cm. prepare bill of quantities of the R.C.C slab. Assume any dimension not given in the figure. Also prepare bar bending schedule. (**12M**)

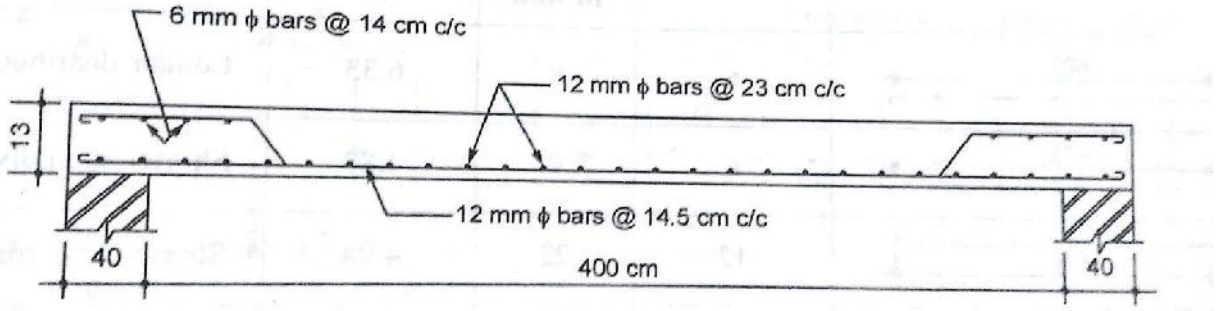


Figure 4

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**Hall Ticket No :** **Question Paper Code :**

**ANIL NEERUKONDA INSTITUTE OF TECHNOLOGY & SCIENCES**
**(AUTONOMOUS)**
III/IV B. Tech II- Semester Regular Examinations April - 2018
**GEOTECHNICAL ENGINEERING-II**
**(CIVIL)**

**Time: 3 hours** **Max Marks: 60**

**Answer ONE Question from each Unit**
**All Questions Carry Equal Marks**
**All parts of the question must be answered in one place only**

**UNIT-I**

1. a) Explain the Mohr-Coulomb failure theory for shear strength of soils. **(6M)**

b) Compute the shear strength of a soil along a horizontal plane at a depth of 5 m in a deposit of sand having the following properties: Angle of internal friction = 36°; dry unit weight = 17 kN/$m^3$; and specific gravity of solids = 2.7. Assume the water table to be at a depth of 2.4 m from the ground level. Also determine the change in the shear strength, if the water table rises up to the ground level. **(6M)**

(**OR**)

2. a) Describe the various shear tests based on drainage conditions. **(6M)**

b) The results of a CU triaxial test conducted on a soil sample are given as follows:

| | | |
|---|---|---|
| Cell Pressure (kPa) | 1000 | 1800 |
| Additional Axial Stress at Failure (kPa) | 1600 | 2200 |
| Pore Pressure at Failure (kPa) | 400 | 800 |

Determine the shear strength parameters with respect to Effective stresses. **(6M)**

**UNIT-II**

3. a) Explain the Electrical Resistivity method of Geophysical exploration. **(6M)**

b) The inner diameters of a sampling tube and cutting edge are 70 and 68 mm, respectively, and their outer diameters are 72 and 74 mm, respectively. Determine the inside clearance, outside clearance, and area ratio of the sampler. Comment on the suitability of the sampler. **(6M)**

(**OR**)

4. a) Explain the salient features of a Geotechnical Investigation Report. **(6M)**

b) The observed N values of standard penetration tests at 6 m and 10 m are 14/16/18 and 18/19/18, respectively. The soil at the 6-m level is clay and at the 10-m level is sand. The water table is at 8 m. The unit weight of clay and sand are 20 kN/$m^3$ and 18.5 kN/$m^3$, respectively. Find the corrected N values at depth 6 m and 10 m. **(6M)**

## UNIT-III

5. a) Distinguish clearly between Active and Passive Earth pressures. **(6M)**

b) A retaining wall with a smooth vertical back, 8-m high, supports a sand soil with $\phi = 30°$. The wall carries a surcharge load of 50 kN/$m^2$. Calculate the magnitude and position of total active thrust on the wall if (i) The water table is below the base of wall ($\gamma$ = 16 kN/$m^3$). (ii) The water table rises up to the ground ($\gamma_{sat}$ = 20.5 kN/$m^3$). **(6M)**

(**OR**)

6. a) Distinguish between Rankine's theory and Coulomb's theory of lateral earth pressure? **(6M)**

b) A 5-m-high smooth retaining wall, with a vertical face, retains a cohesive backfill having an unconfined compressive strength of 30 kN/$m^2$, $\gamma$ = 18 kN/$m^3$, and $\phi_u = 0°$. Calculate the depth of the tension crack and the magnitude and position of total active earth pressure, assuming the tension crack has fully developed. The backfill surface is horizontal. **(6M)**

## UNIT-IV

7. a) Explain the different types of shear failure in soil and their effect on Bearing capacity of soil. **(6M)**

b) Determine the safe bearing capacity of a square footing, 2 m × 2 m at a depth of 1.25 m, in a soil with $\gamma$ = 17.65 kN/$m^3$ and $\gamma_{sat}$ = 18.6 kN/$m^3$, if the water table can rise up to 1 m of ground surface. Take c = 15 kN/$m^2$ and $\phi = 20°$. Use Terzaghi's theory and following bearing capacity factors. **(6M)**

| $\phi$ | $N_c$ | $N_q$ | $N_\gamma$ |
|---|---|---|---|
| 10 | 9.6 | 2.7 | 1.2 |
| 15 | 12.9 | 4.4 | 2.5 |

**(OR)**

8. a) Explain the factors to be considered in deciding depth of foundation. **(6M)**

b) A square footing has to carry a load of 1000 kN. Determine the size of the footing for a factor of safety of 2.50. The depth of the foundation is 1.5 m. The soil has the following properties: G = 2.60, e = 0.53, S = 0.50, $\phi$ = 30°, and C = 10 kN/$m^2$. The water table has the chance of rising to GL. Consider General shear failure and $N_c$ = 30, $N_q$ = 18.4, $N_\gamma$ = 22.4 for $\phi$ = 30°.

**(6M)**

## UNIT-V

9. a) Write down the Engineering News Record Formula. What are the limitations of dynamic formulae? **(6M)**

b) A pile group consists of nine piles of 30-cm diameter and 10-m length, driven in clay. Unconfined compressive strength of soil is 200 kN/$m^2$ and in-situ density of the soil is 20 kN/$m^3$. Determine the safe load for the pile group. Take $\alpha$ = 0.6 and F.S. = 3. **(6M)**

(**OR**)

10. a) Explain the Swedish circle method of slope stability analysis. **(6M)**

b) What is Taylor's stability number? Explain its use for slope stability analysis. **(6M)**

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**Hall Ticket No :** **Question Paper Code :**

**ANIL NEERUKONDA INSTITUTE OF TECHNOLOGY & SCIENCES**
**(AUTONOMOUS)**
III/IV B. Tech II- Semester Regular Examinations April - 2018
**REINFORCED CONCRETE STRUCTURES -II**
**(CIVIL)**

**Time: 3 hours** **Max Marks: 60**

**Answer ONE Question from each Unit**
**All Questions Carry Equal Marks**
**All parts of the question must be answered in one place only**

## Unit – I

1. Floor to floor vertical distance in a residential building is 3.2m. Design a dog legged staircase
   Step size: 150mm rise and 250mm tread
   Imposed load: 2.5kN/$m^2$
   Width of stairs: 1.2m
   Dimensions of stair case: 2.5m x 4.75m
   Assume stairs are to be supported at the ends of the landing slab only, parallel to risers. Use $M_{20}$ concrete and $Fe_{415}$ steel. (**12 M**)

**(OR)**

2. Design a open well type stair for a college building using the following data:
   Floor to floor height: 3.6m
   Number of flights per floor: 3
   Step size: 150mm rise and 300mm tread
   Landings are supported all around by walls and by beams of width 300mm at floor levels. Thickness of wall is 300mm. Use $M_{20}$ concrete and $Fe_{415}$ steel. (**12 M**)

## Unit – II

3. A cantilever retaining wall has to retain earth embankment 2.5m high above ground level. The unit weight of earth is 18kN/$m^3$ and its angle of repose is $30^0$. The embankment is horizontal at its top. The S.B.C of soil may be taken as 200kN/$m^2$ and the coefficient of friction between soil and concrete as 0.5. Using $M_{20}$ grade concrete and $Fe_{415}$ grade steel check the stability conditions of the retaining wall. (**12 M**)

**(OR)**

4. A cantilever retaining wall has to retain earth embankment 3.5m high above ground level. The unit weight of earth is 19kN/$m^3$ and its angle of repose is $30^0$. The embankment is horizontal at its top. The S.B.C of soil may be taken as 210kN/$m^2$ and the coefficient of friction between soil and concrete as 0.5. Using $M_{20}$ grade concrete and $Fe_{415}$ grade steel design the stem of the retaining wall. (**12 M**)

## Unit – III

5. A Counter-fort retaining wall has to retain earth embankment 7m high above ground level. The unit weight of earth is 18kN/$m^3$ and its angle of internal friction is $30^0$. The embankment is horizontal at its top. The S.B.C of soil may be taken as 180kN/$m^2$ and the coefficient of friction between soil and concrete as 0.5. Using $M_{20}$ grade concrete and $Fe_{415}$ grade steel design the toe slab of the counter-fort retaining wall. (**12M**)

**(OR)**

6. A Counter-fort retaining wall has to retain earth embankment 6m high above ground level. The unit weight of earth is 20kN/$m^3$ and its angle of internal friction is $30^0$. The embankment is horizontal at its top. The S.B.C of soil may be taken as 200kN/$m^2$ and the coefficient of friction between soil and concrete as 0.5. Using $M_{20}$ grade concrete and $Fe_{415}$ grade steel design the counter-forts of the retaining wall. (**12 M**)

## Unit - IV

7. A R.C. column 400mm x 400mm carrying a load of 650kN is supported on three piles 400mm x 400mm in section. The centre to centre distance between the piles is 1.5m. Design a suitable pile cap. Use $M_{20}$ concrete and $Fe_{415}$ steel (**12M**)

**(OR)**

8. A column carrying a load of 2500kN has to be supported by four piles each of size 350mm x 350mm. The piles are spaced 1.2m centres. The column size is 550mm x 550mm. Design the pile cap. Use $M_{20}$ concrete and $Fe_{415}$ steel. (**12M**)

## Unit - V

9. (a) Explain the use of high strength concrete and high strength steel in pre-stressed concrete. (**4 M**)

   (b) A pre-stressed concrete rectangular beam 300mm x 600mm is pre-stressed with a force of 1500kN applied at 150mm from the bottom, the force finally reducing to 1300kN. The span of the beam is 12m and carries two live loads of 40kN each at a distance of 3m from each support. Find the extreme fibre stresses at mid span under (i) initial pre-stress and no live load and (ii) final condition. Assume specific weight of concrete as 25kN/$m^3$ (**8 M**)

**(OR)**

10. A pre-stressed concrete beam 300mm x 600mm is pre-stressed by tendons of area 250$mm^2$ at a constant eccentricity of 100mm with an initial stress of 1050N/$mm^2$. Span of the beam is 10.5m. Data regarding losses are Modular ratio = 6; Friction coefficient = 0.0015/m; Anchorage slip = 1.5mm; Ultimate creep strain is 40 x $10^{-6}$ for pre- tensioned and 20 x $10^{-6}$ for post- tensioned; Shrinkage of concrete is 300 x $10^{-6}$ for pre- tensioned and 200 x $10^{-6}$ for post- tensioned; Relaxation of steel is 2.5 %. (**12 M**)

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**Hall Ticket No :** **Question Paper Code :**

**ANIL NEERUKONDA INSTITUTE OF TECHNOLOGY & SCIENCES**
**(AUTONOMOUS)**
III/IV B. Tech II- Semester Regular Examinations April - 2018
**RS & GIS APPLICATIONS IN CIVIL ENGINEERING (Elective-I)**
**(CIVIL)**

**Time: 3 hours** **Max Marks: 60**

**Answer ONE Question from each Unit**
**All Questions Carry Equal Marks**
**All parts of the question must be answered in one place only**

## UNIT-I

1. (a) Explain the principle of Remote sensing? **(6M)**

   (b) Draw and explain the Spectral signature curve of water? **(6M)**

**(OR)**

2. (a) Explain the significance of Atmospheric Windows in Remote sensing? **(6M)**

   (b) Discuss about Electro-Magnetic spectrum with neat sketch? **(6M)**

## UNIT-II

3. (a) Briefly explain the classification of Satellites? **(6M)**

   (b) Write a brief note on LANDSAT satellite programme? **(6M)**

**(OR)**

4. (a) Explain the types of sensors in Remote sensing? **(6M)**

   (b) Write a brief note on QUICKBIRD satellite? **(6M)**

## UNIT-III

5. (a) Explain various elements of Image Interpretation? **(6M)**

   (b) Explain the terms Rectification and Restoration? **(6M)**

**(OR)**

6. (a) Discuss the concept of Image enhancement? **(6M)**

   (b) Write about Sonar remote sensing systems? **(6M)**

## UNIT-IV

7. (a) Briefly explain various elements of GIS? **(6M)**

   (b) Compare Vector and Raster models in GIS? **(6M)**

**(OR)**

8. (a) Discuss the concept of Map overlay? **(6M)**

   (b) Briefly explain about data storage and database management in GIS? **(6M)**

## UNIT-V

9. Explain the applications of RS & GIS in Water Resource engineering? **(12M)**

**(OR)**

10. Explain the applications of RS & GIS in Environmental engineering? **(12M)**

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**ANIL NEERUKONDA INSTITUTE OF TECHNOLOGY & SCIENCES**
**(AUTONOMOUS)**

III/IV B. Tech II- Semester Regular Examinations April - 2018

**TRANSPORTATION ENGINEERING - I**

**(CIVIL)**

**Time: 3 hours** **Max Marks: 60**

**Answer ONE Question from each Unit**
**All Questions Carry Equal Marks**
**All parts of the question must be answered in one place only**

## UNIT-I

1. a) Distinguish between Macadam construction and Telford construction techniques. (**6M**)
   b) Briefly outline the main features of various road patterns commonly in use. (**6M**)

**(OR)**

2 a) Briefly explain the engineering surveys needed for highway alignment. (**6M**)
   b) Explain obligatory points with sketches, discuss how these control the alignment. (**6M**)

## UNIT-II

3. a) Derive the expression for calculating overtaking sight distance of a two lane two way road with a help of neat sketch. (**6M**)
   b) The speeds of overtaking and overtaken vehicles are 70 and 40 kmph, respectively on a two way traffic road. The average acceleration during overtaking may be assumed as 0.99m/sec$^2$.
      (i) Calculate safe overtaking sight distance
      (ii) What is the minimum length of overtaking zone?
      (iii) Draw a neat-sketch of the overtaking zone and show the positions of the sign posts. (**6M**)

**(OR)**

4 a) Describe the various cross sectional elements of a pavement with neat sketches. (**6M**)

b) Derive an equation for the valley curves. (**6M**)

## UNIT-III

5. a) Using the data given below, calculate the wheel load stresses at (i) interior, (ii) edge and (iii) corner regions of a cement concrete pavement using Westergaard's stress equations. Also determine the probable location where the crack is likely to develop due to corner loading. Wheel load = 5100 kg, E = 3 x $10^5$ kg/$cm^2$, h = 18 cm, μ = 0.15, K = 6.0 kg/$cm^3$ and a = 15 cm. (**6M**)

   b) Explain in detail how the flexible pavements differs from rigid pavements. (**6M**)

**(OR)**

6. a) Calculate the design wheel load in terms of standard axles for two-lane undivided carriage way using following data:
   Initial traffic = 2000 CVPD, Average growth factor = 7%, Design life = 20 years and VDF value = 2.5. Also determine the thickness of pavement. (**6M**)

   b) Discus briefly IRC recommendations for design of concrete roads. (**6M**)

## UNIT-IV

7. a) List out the various tests conducted on sample aggregates. Explain any two aggregate tests with IRC specifications. (**6M**)

   b) Mention the specifications of materials and construction procedure for cementconcrete roads. (**6M**)

**(OR)**

8. a) What are the objects of providing contraction joint in cement concrete pavements? Mention the factors to be considered. (**6M**)

   b) Write a note on importance of highway drainage. (**6M**)

## UNIT-V

9. a) Define traffic volume. Enumerate the different methods of carrying out traffic volume studies, indicate the principle of each. (**6M**)

   b) With neat sketches show some of the important types of regulatory traffic signs and mention the function of each. (**6M**)

**(OR)**

10. a) The width of approaches for a rotary intersection is 12 m. The entry and exit width at the rotary is 10 m. Table below gives the traffic from the four approaches, traversing the intersection. Find the capacity of the rotary. (**12M**)

| Approach | Left turn | Straight | Right turn |
|---|---|---|---|
| North | 400 | 700 | 300 |
| South | 350 | 370 | 420 |
| East | 200 | 450 | 550 |
| West | 350 | 500 | 520 |

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**Hall Ticket No :** **Question Paper Code :**

**ANIL NEERUKONDA INSTITUTE OF TECHNOLOGY & SCIENCES**
**(AUTONOMOUS)**
III/IV B. Tech II- Semester Regular Examinations April - 2018

# Water Resources Engineering-I

**(CIVIL)**

**Time: 3 hours** **Max Marks: 60**

**Answer ONE Question from each Unit**
**All Questions Carry Equal Marks**
**All parts of the question must be answered in one place only**

## UNIT – I

**1 (a)** What is meant by precipitation? Explain working of Weighing bucket rain gauge with the help of neat sketch **(6M)**

**(b)** Determine the average rainfall value for the given catchment with the following data **(6M)**

| Area of Thiessen polygon ($km^2$) | 250 | 850 | 600 | 300 | 280 | 500 | 100 | 50 | 20 |
|---|---|---|---|---|---|---|---|---|---|
| Rainfall values at rain gauge stations (cm) | 50 | 25 | 20 | 15 | 35 | 15 | 18 | 20 | 29 |

(**OR**)

**2 (a)** What is meant by Infiltration? Explain factors effecting Infiltration **(6M)**

**(b)**Derive 2-h unit hydrograph from the given 4-h unit hydrograph **(6M)**

| Time (h) | 0 | 4 | 8 | 12 | 16 | 20 | 24 | 28 |
|---|---|---|---|---|---|---|---|---|
| Ordinates of 4-h UH ($m^3/s$) | 0 | 10 | 30 | 25 | 18 | 10 | 5 | 0 |

## UNIT – II

**3 (a)** Derive an expression for discharge of an unconfined aquifer under steady flow Conditions **(6M)**

**(b)** Explain pumping test and recovery test for determination of well yield **(6M)**

(**OR**)

**4 (a)** A 30cm diameter well completely penetrates a confined aquifer of permeability of 45m/day. The length of the strainer is 20m. Under steady state of pumping the drawdown the well was found to be 3.0m and the radius of influence was 300m.Calculate discharge **(6M)**

**(b)** Explain (1) Darcy's law,(2) Specific capacity,(3) Well efficiency **(6M)**

## UNIT – III

**5 (a)** Explain different storage zones of a reservoir with a neat sketch **(6M)**

**(b)** Explain the procedure for fixing the reservoir capacity using
i. Mass curve technique
ii. Demand curve technique **(6M)**

(**OR**)

**6 (a)** Explain different methods by which reservoir sedimentation can be controlled **(6M)**
**(b)** Explain different methods available for apportionment of total cost of multipurpose Reservoir **(6M)**

## UNIT – IV

**7 (a)** Explain different methods of surface irrigation system **(6M)**
**(b)** Explain various factors affecting Duty of an irrigation canal **(6M)**

(**OR**)

**8 (a)** Determine the frequency of irrigation for the soil having following details **(6M)**

| | |
|---|---|
| Field Capacity | 27% |
| Permanent wilting point | 14% |
| Dry density of soil | 15kN/$m^3$ |
| Effective depth of root zone | 75cm |
| Consumptive use of water | 11mm |

**(b)** A water course has a culturable command area of 1200 hectares the intensity of irrigation for crop A is 40% and for crop B is 35% both the crop being rabi crops.Crop A has kor period of 20 days and crop B has kor period of 15 days. Calculate the discharge of water course if the kor depth of crop A is 10cm and for crop B is 16cm **(6M)**

## UNIT – V

**9 (a)** Explain different classifications of canals **(6M)**

**(b)** Design a Channel section by Kennedy's theory with the following data **(6M)**

| | |
|---|---|
| Discharge | 28 $m^3/s$ |
| Kutter's N | 0.0225 |
| Critical Velocity ratio (m) | 1 |
| Side slope | ½ :1 |
| B/D ratio | 7.6 |

(**OR**)

**10 (a)** Design an irrigation channel in alluvial soil according to Lacey's silt theory with the Following data **(6M)**

| | |
|---|---|
| Full supplyDischarge | 15 $m^3/s$ |
| Lacey's si;t factor | 1 |
| side slopes of the channel | 0.5 : 1 |

**(b)** Using Tractive force approach, design a channel in alluvial soil for the data **(6M)**

| | |
|---|---|
| Discharge | 45 $m^3/s$ |
| Bed slope | 1/4800 |
| Manning's N | 0.0225 |
| Permissible tractive stress | 0.035$kN/m^2$ |

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