

7E7061

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B.Tech. VII- Semester(Main&Back) Examination, November - 2019  
 Civil Engineering  
 7CE1A Water Resources Engineering - I

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 26

**Instructions to Candidates:**

*Attempt any five questions, selecting one question from each unit. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.*

**UNIT - I**

1. a) Write a short note on advantages and disadvantages of Irrigation. (8)
- b) What are the various factors on which the consumptive use of water depends. Explain them. (8)

**(OR)**

1. a) After how many days will you supply water to soil in order to ensure irrigation for following data of soil  
 Field capacity of soil = 27%  
 Permanent wilting point = 14%  
 Dry density of soil = 15 kN/m<sup>3</sup>.  
 Effective depth of root zone = 75 cm  
 Daily consumptive use of water = 11mm. (8)
- b) What are the various types of irrigation efficiencies. Explain. (8)

**UNIT - II**

2. a) Differentiate clearly between Kennedy's and Lacey's theory. (8)
- b) Draw cross sections of channels in cutting and filling and explain the purpose of various components involved. (8)

**(OR)**

2. a) Design a Lacey's regime channel flowing through material of average diameter 0.328 mm for following data  
Culturable command area = 100000 hectares  
Intensity of irrigation Rabi = 40% Kharif = 30%.  
ODF Rabi = 1800hec/Cumec  
Kharif = 800hec/Cumec. Assume  
Conveyance losses = 10%. (8)
- b) What are the various types of losses in Channel. Explain. (8)

### UNIT - III

3. a) What are the various components of canal Regulation work. Explain. (8)
- b) Write a short note on river training and bank protection work. (8)

(OR)

3. a) What are the various stages of river. Explain their significance in relation to irrigation Engg. (8)
- b) Describe the Tractive force approach for channel design. (8)

### UNIT - IV

4. a) What are the various types of channel linings. Explain. (8)
- b) Explain the various types of tube wells. (8)

(OR)

4. a) What are the ill effects of water logging Explain. (8)
- b) How the water logging phenomenon can be prevented. Explain. (8)

### UNIT - V

5. a) What are the various method of estimation of average rainfall over a basin. (8)
- b) Explain following.
- i) Depth Area duration Curves.
- ii) Double Mass curve of rainfall (2×4=8)

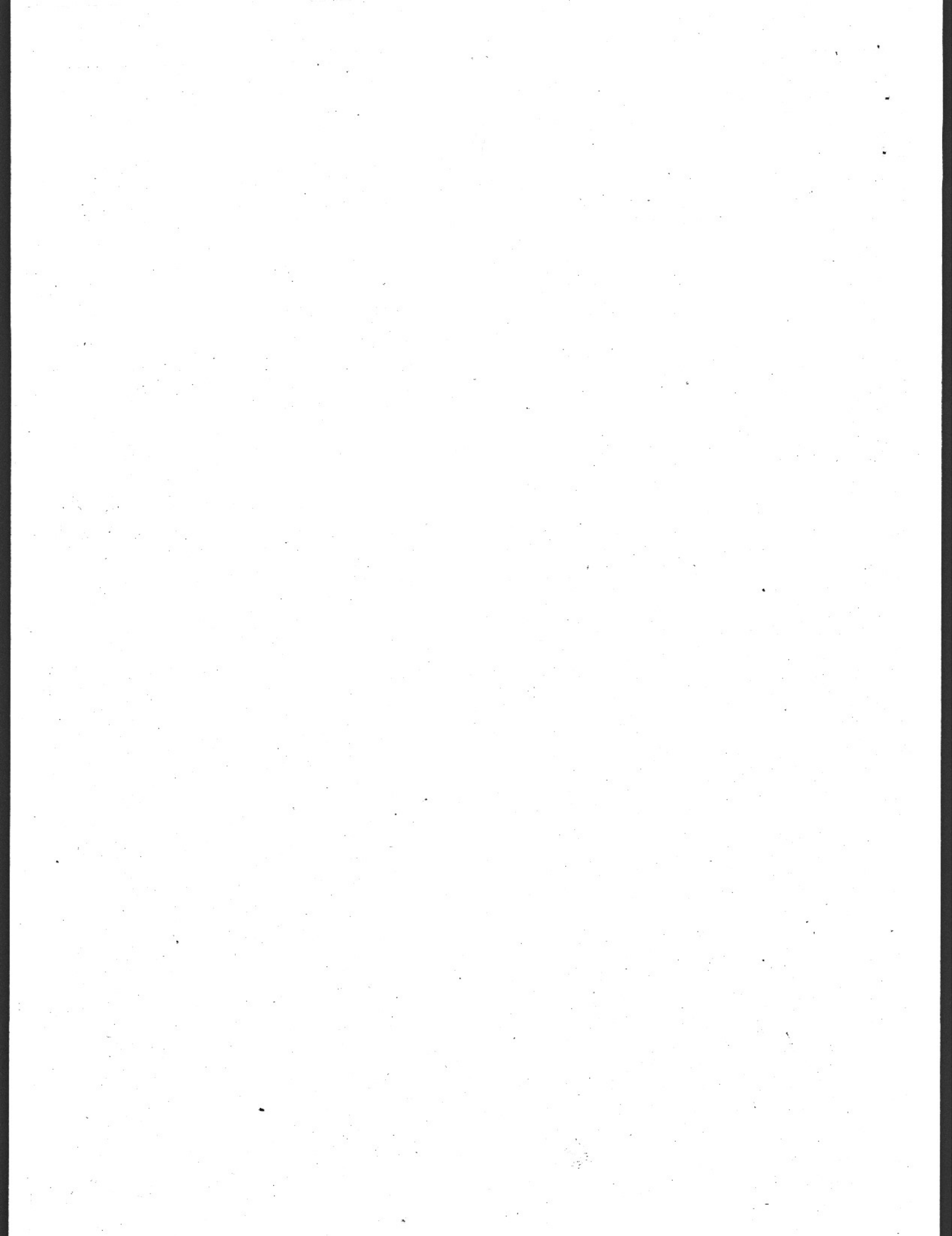
(OR)

5. a) Describe Infiltration with its equation Also state and explain factors affecting Infiltration. (8)

b) From the given 6 hr UH Derive 9 H UH for same catchment. (8)

Time in (hrs)	Ordinates of 6 hrs (UH) (Cumecs)
00	0
03	9
06	20
09	35
12	49
15	35
18	28
21	22
24	17
27	12
30	9
33	6
36	3
39	2
42	0

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B.Tech VII Semester (Main/Back) Examination, November - 2019

Civil Engg.

7CE2A Design of Steel Structures - I

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 26

**Instructions to Candidates:**

Attempt any **five** questions, selecting **one** question from **each** unit. All questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205).

1. I.S. 800-2007
2. Steel Tables.

**Unit - I**

1. a) Discuss briefly types of steels used in structures. (4)
- b) How a cross section is classified as per the code? Briefly state their characteristics. (4)
- c) Using kinematical method or otherwise compute the collapse load for the beam shown in fig. 1. (8)

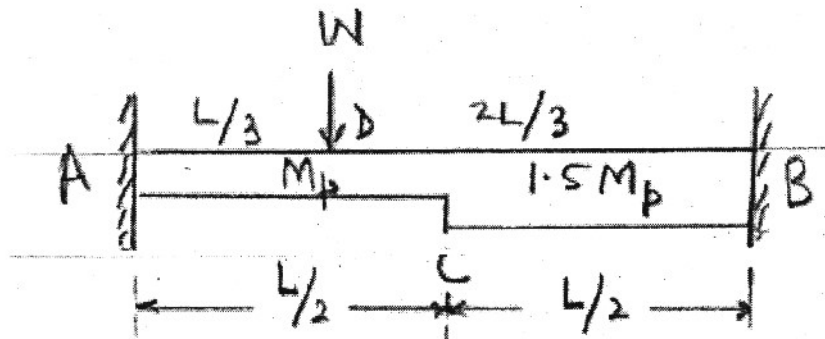
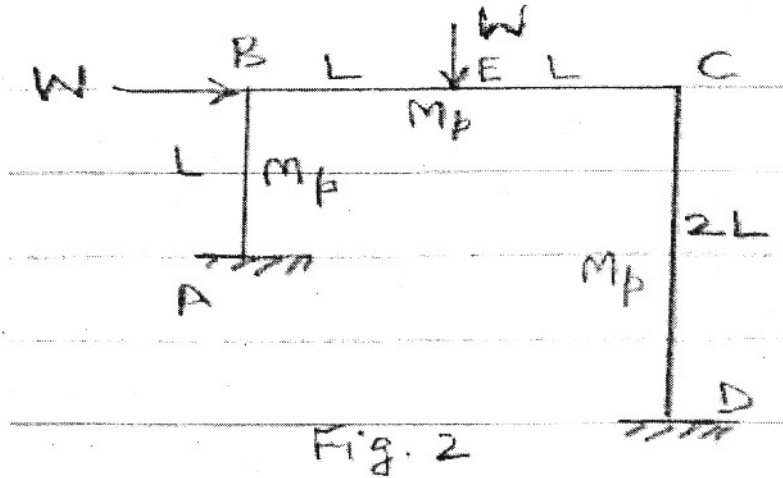


Fig-1

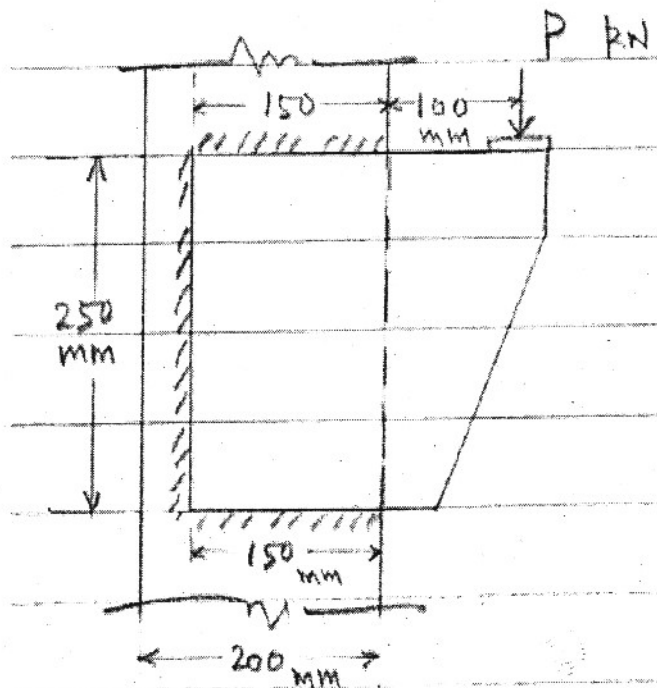
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OR

1. a) Calculate the shape factor for a diamond section. (4)
- b) A portal frame is loaded as shown in Fig. 2. Compute the true value of collapse load. (12)



### Unit - II

2. a) Calculate the strength of a 20 mm diameter bolt of grade 4.6 to be used in a lap joint. The main plates are 12 mm thick each. (4)
- b) Fig.3 shows an eccentrically loaded fillet weld connection. Calculate the maximum value of factored load P to be applied as shown so that the connection is safe. The weld sized throughout is 6 mm. (12)



OR

2. a) Briefly explain 'prying action' in bolted connection. (4)
- b) Design a single angle section for a tension member to carry a factored axial load of 200 kN. Use unequal angle and 18 mm. bolts. (12)

Unit - III

3. a) What are buckling classes and how do they affect compressive carrying capacity of columns? (6)
- b) An angle section ISA 100×75×10 has been used in a steel roof truss as a strut. Find the maximum factored axial load which it can take safely. The length between centres of connections may be taken as 1.5 m. (10)

OR

3. Design a built up column taking two channels placed face to face, to carry an axial compressive load of 1300 kN. the height of the column is 3.5 m and is hinged at both ends. Also design a single system of lacings for the column. (16)

Unit - IV

4. a) What is 'lateral torsional buckling' with reference to a beam design. (4)
- b) A beam of span 4.0 m is simply supported at the ends. It carries a super imposed load of 20 kN/m over the whole length. Design a suitable I section for the beam if it is laterally supported. (12)

OR

4. a) Differentiate between "web buckling" and "web crippling" in a beam design. (6)
- b) A simply supported beam of span 5 m consists of a section ISLB 450 @ 65.26 kg/m. The compression flange of the beam is laterally unrestrained. Determine the design moment of the beam. Also calculate maximum u.d.l. which it can carry safely. (10)

## Unit - V

5. a) Write a brief note on slab base for a column. (4)
- b) A column ISHB 250 @ 54.72 kg/m has a length 4.0 m. It is subjected to an axial load of 800 kN and a moment of 30 kN - m about x - x axis. Taking  $K = 0.85$ , determine whether the section is safe? (12)

OR

5. Design a two tier grillage foundation for a column consisting of section ISHB 400 @ 82.16 kg/m. and carrying an axial load of 1600 kN; The column rests symmetrically on a square base plate 700 mm  $\times$  700 mm. Take bearing capacity of the soil as 150 kN/m<sup>2</sup>. (16)



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B.Tech. VII -Semester (Main/Back) Examination November - 2019

Civil Engg.

7CE3A Design of Concrete Structures - II

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 26

**Instructions to Candidates:**

Attempt any **five** questions, selecting **one** question from **each** unit. All questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205).

- |                    |                             |
|--------------------|-----------------------------|
| 1. IS - 456 (2000) | 2. IS - 3370 (Part II & IV) |
| 3. IRC - 21 (1987) | 4. IRC - 6 (2000)           |
| 5. IS 1343 (1980)  |                             |

**Unit - I**

1. a) What is merits and demerits of prestressed concrete? (4)
- b) What do you understand by losses in prestressing concrete? Explain loss of prestress due to curvature effect and wobble effect. (12)

**(OR)**

1. a) What is the classification of prestress? Explain in brief. (6)
- b) A simply supported concrete beam having cross - section of 300 mm × 500 mm, is loaded with a total UDL of 230 kN over a span of 5m. Find the extreme fiber stresses at mid span and end sections if prestressing force if 1920 kN and the tendon is eccentric, located at 200 mm above bottom fiber. Also sketch the stress distribution diagramme. (10)

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Unit - II

2. a) Explain concept of moment redistribution in beams. (6)  
 b) Draw maximum bending moment

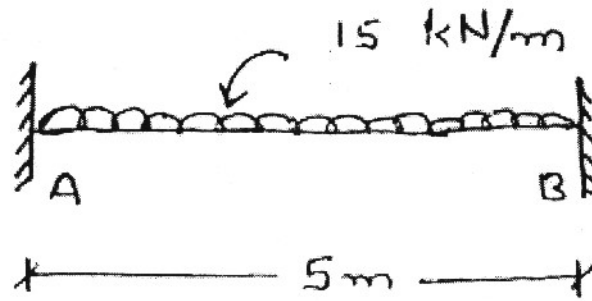


Figure - 2.1

diagramme for a fixed ended beam carrying 15 kN/m load at collapse as shown in figure 2.1. (10)

(OR)

2. Design a rectangular beam having cross - section of 250 mm×500 mm. Beam is subjected to moment ( $M_u$ ) = 50 kN - m, shear force  $V_u$  = 50 kN and torsional moment  $T_u$  = 30 kN - m. Take concrete grade of M20 and steel grade of Fe 415. (16)

Unit - III

3. Derive the expression for meridional thrust and hoop stresses in circular dome. (16)

(OR)

3. Design a rectangular water tank resting on ground having base area of 5 m × 7m. The height of water tank is 4 m and keep a free board of 0.20 m. Assume M - 25 grade of concrete and steel Fe - 415. Assume appropriate data. (16)

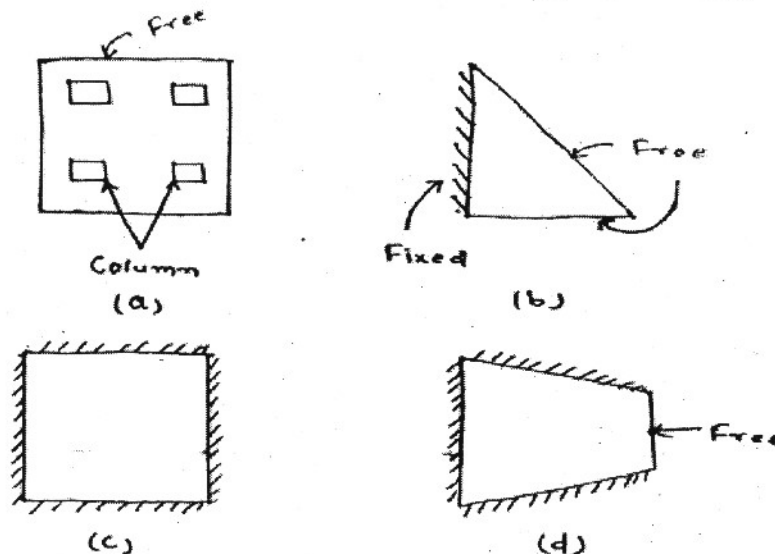


Figure - 4.1

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**Unit - IV**

4. a) Explain counterfort and buttress type retaining wall. (8)
- b) Draw yield line diagramme of slabs given in figure 4.1. (8)

**(OR)**

4. Design a cantilever retaining wall to support a bank of earth 5 m high above the earth level at the toe of thhe wall. A building is to be built on the backfill. Assume that a 3 m surcharge will approximate the lateral earth pressure effect.

Consider : Earth density =  $17 \text{ kN/m}^3$ .

Angle of internal friction =  $35^\circ$

Coefficient of friction between concrete and soil = 0.45  
bearing capacity =  $150 \text{ kN/m}^2$ . Use M - 30 grade of concrete and Fe 415 grade of steel.

**(16)**

**Unit - V**

5. Design a deck slab for the following data :

Clear span = 6 m

Bearing width = 450 mm

Thickness of a deck slab = 500 mm

Width of deck slab = 8.5 m

With of foot path on either side = 1m

Wearing coat = 100 mm

Loading = IRC class (AA) tracked

Concrete = M - 25 and steel = Fe - 415

**(16)**

**(OR)**

5. Write the short note on following :

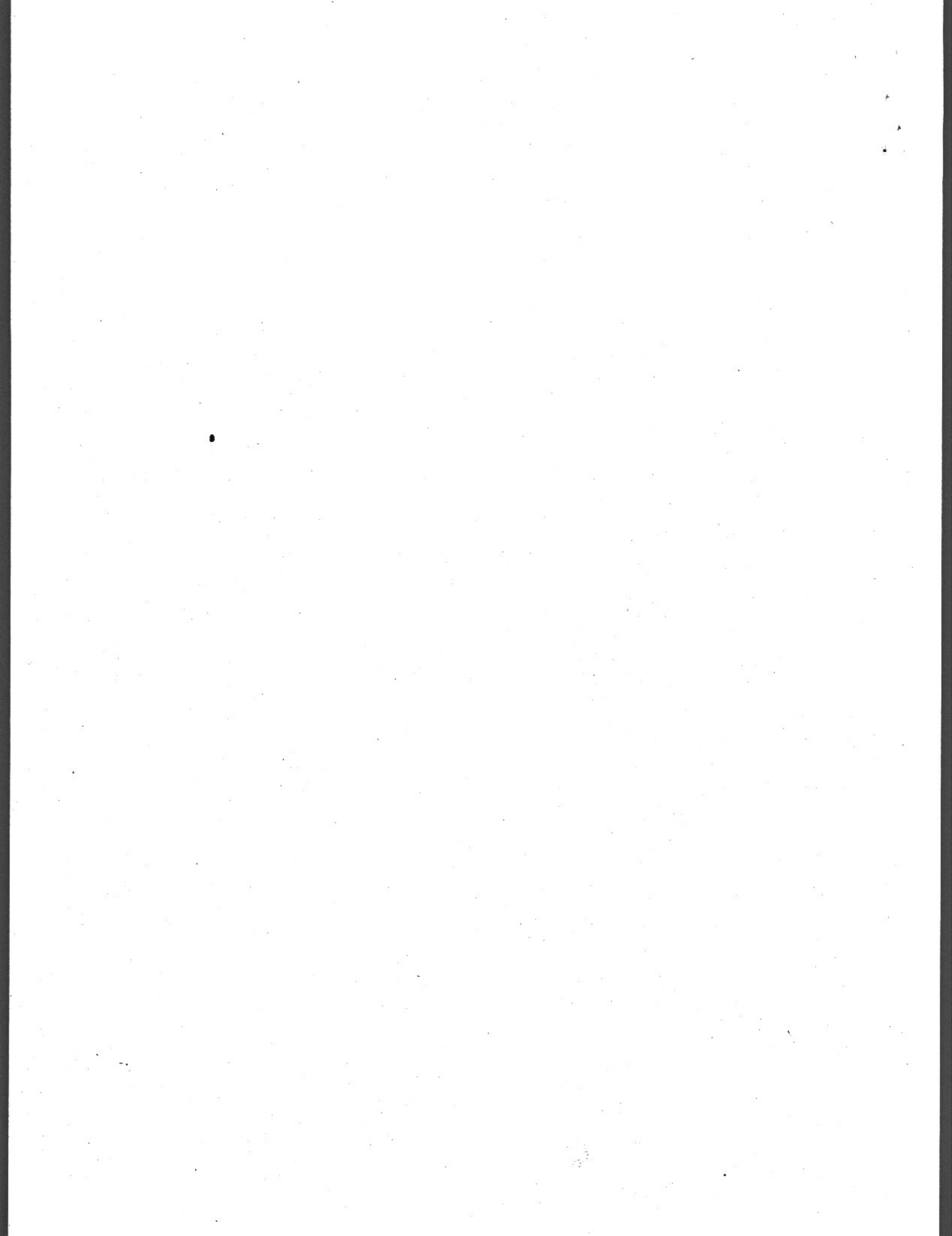
a) Hydraulic factors in bridge design.

b) Disposition of tracked vehicle (AA class)

c) Design load For kerb

d) Check for shear stress (As per IRC : 2L - 1987)

**(16)**



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**B.Tech. VII - Semester (Main&Back) Examination, Nov. - 2019**  
**Civil Engineering**  
**7CE4A Transportation Engineering - II**

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 26

**Instructions to Candidates:**

*Attempt any **five** questions, selecting **one** question from **each** unit. All questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.*

**UNIT - I**

1. a) Draw a neat sketch of a permanent way on an embankment. Name the various components. (8)
- b) What is coning of wheels? What are advantages of coning? (8)

**(OR)**

1. a) Mention the advantages of using a uniform Gauge for railway track in a country. What common Gauges are used in India? (8)
- b) Why creep in rails occurs? Mention the remedial measures to prevent creep. (8)

**UNIT - II**

2. a) Through a diagram show a typical layout of a left hand turnout of railway track. Name and show its various components. (8)
- b) What are the objectives of Urban mass Transportation? Which Railway systems of mass transportation are used in Indian cities? (8)

**(OR)**

2. a) What are the function of point and crossings in a Railway track? Mention requirements of a good crossing. (8)
- b) Explain the following :
  - i) Popular railway Mass transportation system networks.

- ii) Gauntlet track
- iii) Check rails
- iv) Double turnout. (8)

**UNIT - III**

- 3. a) Why super elevation is provided on railway curves? Explain negative super elevation. (8)
- b) Describe the purpose of different type of Gradients used in a Railway track. (8)

(OR)

- 3. a) Derive an expression, relating superelevation (e), width of Railway Gauge(G), Speed (V) and the Radius of Curve (R). (8)
- b) What are the objectives of providing Transition curves of Railways? Explain how length of Transition curve is decided. (8)

**UNIT - IV**

- 4. a) Draw a Typical layout of an international Airport. Showing its component parts. Briefly mention function of each component. (8)
- b) Write short notes on the following :
  - i) Cross wind component
  - ii) Basic runway length
  - iii) Imaginary surfaces
  - iv) Runway Threshold. (8)

(OR)

- 4. a) Why corrections are required to Runway Lengths? What are the recommendations for applying the different corrections? (8)
- b) Write short notes on the following :
  - i) Wind Rose diagram
  - ii) Runway patterns.
  - iii) Aprons in an airport
  - iv) Terminal Building and its functions. (8)

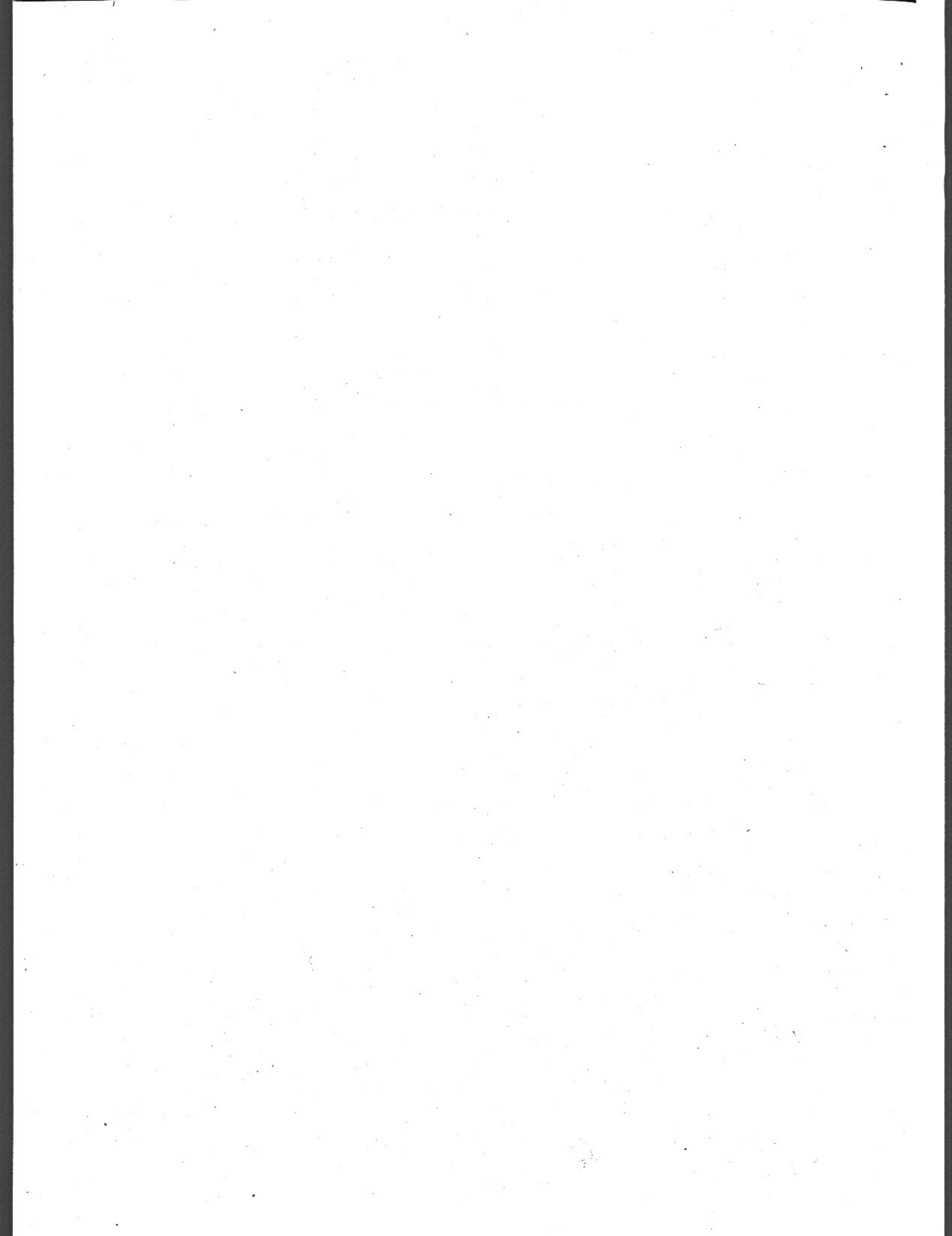
**UNIT - V**

5. a) What are the significant differences between principles of Airport Pavement Design from design of highway pavements. (8)
- b) Explain the following : (8)
- i) Equivalent single wheel load (ESWL)
  - ii) Westergaard's method of Rigid Pavement Design, for airport pavements.

**(OR)**

5. a) Describe the various factors that are considered in structural design of airport pavements. (8)
- b) Explain the following :
- i) Radius of relative stiffness.
  - ii) CBR method of Flexible pavement Design for airport pavements. (8)







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**B.Tech. VII- Semester (Main/Back) Examination, Nov. - 2019**  
**Civil Engg.**  
**7CE5A Application of Numerical Methods**  
**in Civil Engg.**

**Time : 3 Hours****Maximum Marks : 80****Min. Passing Marks : 26****Instructions to Candidates:**

*Attempt any five questions, selecting one question from each unit. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

**Unit - I**

1. a) Convert  $(10011011)_2$  to the corresponding decimal Number system. (4)
- b) Convert  $(11100011)_2$  to the corresponding decimal number system. (4)
- c) Explain the term Errors and their types in numerical computation? (8)

**OR**

1. a) Convert  $(189)_{10}$  to the corresponding Binary number system. (4)
- b) Convert  $(0.8125)_{10}$  to the corresponding binary number system. (4)
- c) Explain the following terms in brief:
  - i) Accuracy
  - ii) Precision
  - iii) Significant digit
  - iv) Propagation of errors. (4×2)

**Unit - II**

2. a) Find the real root of equation  $x.e^x - 2 = 0$  correct to two decimal places using Newton - Raphson method? (8)
- b) Explain method of successive substitution with one suitable example? (8)

**OR**

2. a) Compute root of the equation  $x^3 - 10x + 3 = 0$  in the interval (0,1) using the secant method? (8)
- b) Explain Regula Falsi Method with one suitable example? (8)

### Unit - III

3. a) Solve the linear system of equations by using cramer's rule?

$$3x_1 + 4x_2 - 3x_3 = 5$$

$$3x_1 - 2x_2 + 4x_3 = 7$$

$$3x_1 + 2x_2 - x_3 = 3$$

(10)

- b) Find the rank of the given matrix?

$$\begin{bmatrix} 3 & 1 & -1 & 2 \\ 2 & -1 & 2 & 6 \\ 2 & 1 & -2 & -2 \end{bmatrix}$$

(6)

### OR

3. a) Use Gaussian elimination method to solve the system of linear equations :-

$$2x_2 + x_3 = -8$$

$$x_1 - 2x_2 - 3x_3 = 0$$

$$-x_1 + x_2 + 2x_3 = 3$$

(12)

- b) Explain the Gauss - Jordan Method? (4)

### Unit - IV

4. Solve the following system of linear equations by LU decomposition method?

$$9x_1 + 3x_2 + 3x_3 + 3x_4 = 24$$

$$3x_1 + 10x_2 - 2x_3 - 2x_4 = 17$$

$$3x_1 - 2x_2 + 18x_3 + 10x_4 = 45$$

$$3x_1 - 2x_2 + 10x_3 + 10x_4 = 29$$

(16)

### OR

4. Using Gauss Seidel iterative method solve the following system of equations :-

$$4x_1 + x_2 - x_3 = 3$$

$$2x_1 + 7x_2 + x_3 = 19$$

$$x_1 - 3x_2 + 12x_3 = 31$$

(16)

## Unit - V

5. a) Using Newton's divided difference formula, find the value of  $f(9)$ ,  $f(12)$  and  $f(14)$  from the following table : (12)

x	4	5	7	10	11	13
f(x)	48	98	295	723	895	1500

- b) What is the use of interpolation in Civil Engineering problems? (4)

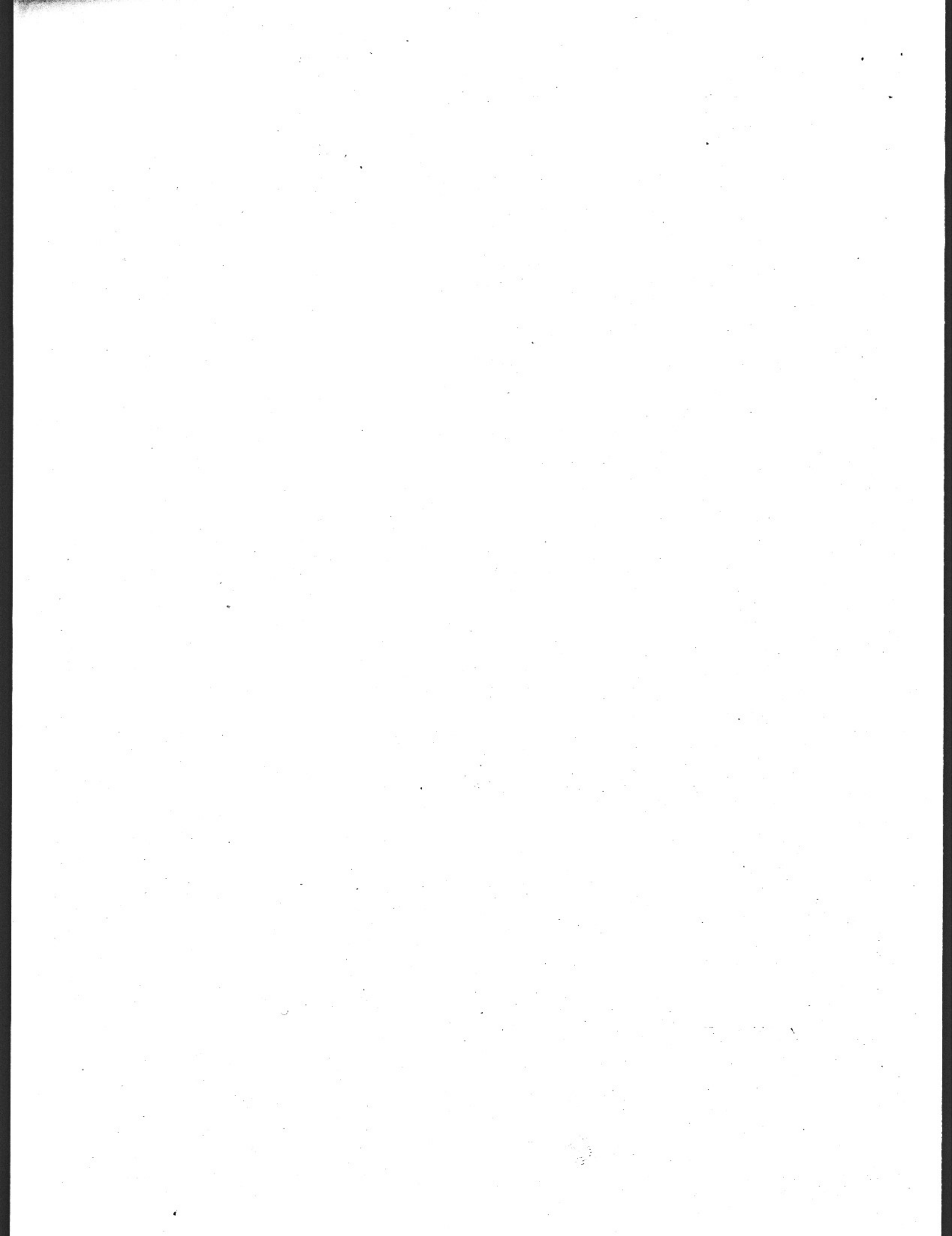
OR

5. a) Using the method of least - squares, find an equation of the form  $y = ax + bx^2$  that fits the following data : (10)

x	1	2	3	4	5	6
y	2.4	5.6	8.5	14.2	18.7	22

- b) Explain Lagrangian Interpolation method with suitable example? (6)





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<b>7E7066</b>	Roll No. _____	[Total No. of Pages : <span style="border: 1px solid black; padding: 2px;">2</span> ]
<b>7E7066</b>		
<b>B.Tech. VII- Semester (Main&amp;Back) Examination, Nov. - 2019</b> <b>Civil Engineering</b> <b>7CE6.1A Advance Transportation Engineering</b>		

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 26

**Instructions to Candidates:**

*Attempt any Five questions, selecting one question from each unit. All Questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.*

**UNIT - I**

1. a) Discuss origin Destination studies. (8)
- b) Describe the characteristics of parking. (8)

(OR)

1. a) Describe various highway inventories will you collect while doing road survey work. (8)
- b) What is speed study? Describe any four methods for conducting speed studies. (8)

**UNIT - II**

2. Explain
  - i) Linear Regression
  - ii) Correlation (16)

(OR)

2. a) Explain the objective of sampling theory in traffic engineering. (8)
- b) Explain mean, standard deviation and variance in traffic study. (8)

**UNIT - III**

3. a) Explain speed and density relationship with neat sketch. (8)  
b) Describe various vehicular characteristics. (8)

(OR)

3. a) Explain any one method of design of signals. (8)  
b) Explain with neat sketch design of roundabouts. (8)

**UNIT - IV**

4. a) What are the various regulations for drivers during driving. (8)  
b) Explain pedestrian and mixed traffic. (8)

(OR)

4. a) Explain various traffic markings with neat sketch. (8)  
b) Describe various traffic islands with neat sketch. (8)

**UNIT - V**

5. a) Explain various road safety equipments. (8)  
b) Write short note on road safety. (8)

(OR)

5. a) Discuss the effects of traffic on air pollution. (8)  
b) Explain noise pollution and visual intrusion which is caused due to traffic. (8)

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<b>7E7068</b>		
<b>B.Tech. VII- Semester (Main&amp;Back) Examination, Nov. - 2019</b>		
<b>Civil Engg.</b>		
<b>7CE6.3A Rural Water Supply And Sanitation</b>		

**Time : 3 Hours**

**Maximum Marks : 80**  
**Min. Passing Marks : 26**

**Instructions to Candidates:**

*Attempt any five questions, selecting one question from each unit. All Questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.*

**UNIT - I**

1. a) Explain the hand pump technology in detail. (8)
- b) Discuss the health conditions and economic conditions, prevailing in Indian villages. (4+4)

**(OR)**

1. a) Explain different types of wells, with their functioning. (8)
- b) Give a detail account of various water harvesting techniques prevalent in rural areas. (8)

**UNIT - II**

2. a) Discuss the quality standards of water needed for a village community. How does this differ from urban community? (6+2=8)
- b) Explain Guinea worm Eradication. (8)

**(OR)**

2. a) What are communicable diseases and how can these be controlled? (8)
- b) How will you estimate the total water requirement of a place in rural area? (8)

**UNIT - III**

3. a) Explain the mechanism of de - flouridation by Nalgonda technique. Give some salient features of this technique. (6+2=8)
- b) Explain horizontal roughning filter with a neat sketch. (8)

**(OR)**

3. a) Explain the utility and design of slow sand filter with respect to rural water supplies. (8)
- b) Discuss the different methods of disinfection of rural water sources. (8)

**UNIT - IV**

4. a) Discuss the life cycle of mosquitoes. Also mention the remedial measures for control of mosquito nuisance. (4+4=8)
- b) What is Botulism? Also mention its preventions. (4+4=8)

**(OR)**

4. a) Explain different methods of milk testing. (8)
- b) What is food poisoning? Discuss the different causes and preventions for it. (2+3+3=8)

**UNIT - V**

5. a) What is bio - gas technology? What are the parameters responsible for optimum production of bio - gas? (4+4=8)
- b) What is composting? Explain various methods of composting. (4+4=8)

**(OR)**

5. a) What is a septic tank? Explain its construction and designing steps. (2+6=8)
- b) Describe VIP latrines. State its advantages over other conventional latrines used in villages. (4+4=8)