

<b>7E7061</b>	Roll No. _____	Total No of Pages: <span style="border: 1px solid black; padding: 2px;">4</span>
<p><b>7E7061</b></p> <p><b>B. Tech. VII Sem. (Main / Back) Exam., Nov. – Dec. - 2018</b></p> <p><b>Civil Engineering</b></p> <p><b>7CE1A Water Resources Engineering - I</b></p>		

**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. NIL

2. NIL

### UNIT-I

Q.1 (a) Write short notes on the following- [8]

(i) Comparison of sprinkler and drip irrigation

(ii) Quality standard for irrigation water

(b) A watercourse has a culturable command area of 1100 hectares. The intensity of irrigation for crop A is 40% and for crop B is 30%, both crops being Rabi crops. Crop A has a Kor period of 20 days and crop B has a Kor period of 15 days. Calculate the outlet discharge of the water course if the Kor depth for crop A is 10 cm and for crop B is 16 cm. [8]

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**OR**

- Q.1 (a) What is subsurface irrigation? Differentiate between the natural subsurface irrigation and the artificial subsurface irrigation. [8]
- (b) Define the following terms- [8]
- (i) Frequency of irrigation
  - (ii) Crop rotation
  - (iii) Irrigation efficiencies
  - (iv) Consumptive use of water

**UNIT- II**

- Q.2 (a) Discuss the factors governing the selection of alignment of main canal and its distributaries. [8]
- (b) What are Lacey's basic regime equations? Starting from these equations, derive the equations for- [8]
- (i) Wetted perimeter
  - (ii) Hydraulic radius
  - (iii) Bed slope

**OR**

- Q.2 (a) Write short notes on the following- [8]
- (i) Role of command area development
  - (ii) Estimation of channel losses
  - (iii) Rotational delivery
  - (iv) Silt control in canals
- (b) Compare the Kennedy's and Lacey's theories for the design of alluvial channels. What are the drawbacks of both theories? [8]

**UNIT- III**

- Q.3 (a) What are the basic principles of regulation of a canal system? Describe the methods of regulation of a canal system. [8]
- (b) Define flexibility, setting, sensitivity, efficiency, proportionality, modular limits of a canal outlet. [8]

**OR**

- Q.3 (a) What do you understand by river training works? Draw neat sketches of Guide banks and Spurs. Also explain their functions. [8]
- (b) What do you understand by critical tractive force? Explain initial and final regime condition of channels. Also discuss the mechanics involved in sediment transport. [8]

**UNIT- IV**

- Q.4 (a) What are saline, saline-alkali and alkali soils and explain how you will reclaim each one of these soils? [8]
- (b) Differentiate between an open well and a tube well. What are the advantages of tube wells over open wells? [8]

**OR**

- Q.4 (a) Explain the advantages and disadvantages of canal lining. [8]
- (b) Design a trapezoidal shaped concrete lined channel to carry a discharge of 120 cumecs at a slope of 20 cm/km. The side slopes of the channel are 1.5:1. The value of N may be taken as 0.014. Assume limiting velocity as 1.5m/s. [8]

**UNIT- V**

- Q.5 (a) What is Hydrological cycle? Give brief description of different components of hydrological cycle. [8]
- (b) Describe run-off. Differentiate between direct run-off and base flow. What are various components of run-off? [8]

**OR**

- Q.5 (a) Draw a neat diagram of Symon's rain gauge, clearly showing all its dimensions. How will you select a site for rain gauge station? [8]
- (b) What is a unit hydrograph? What are the basic propositions and limitations of the unit hydrograph theory? [8]

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7E7062

B. Tech. VII Sem. (Main / Back) Exam., Nov. – Dec. - 2018

Civil Engineering

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.

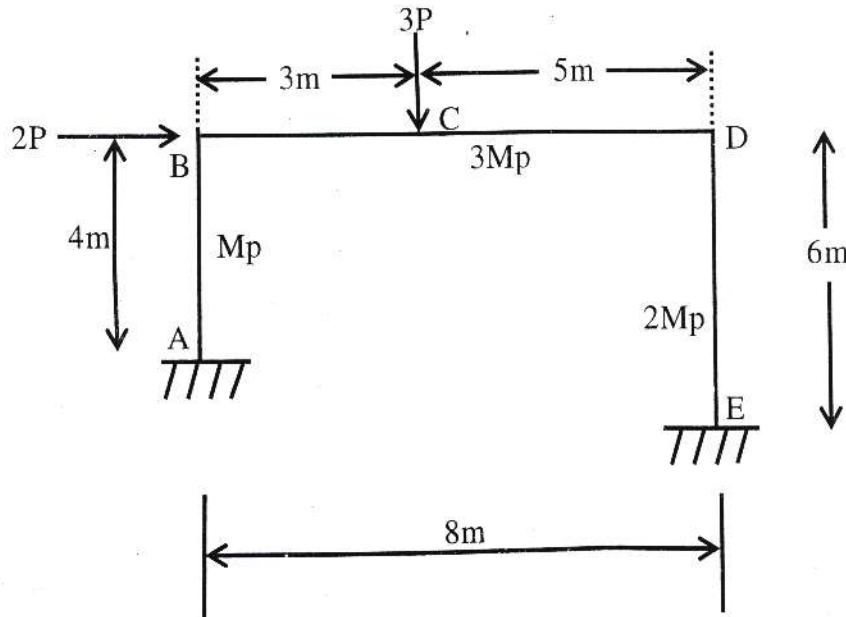
Units of quantities used/calculated must be stated clearly.

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

- 1. IS : 800 2007
- 2. Steel Table
- 3. IS Handbook for structural engineering Vol. - 1

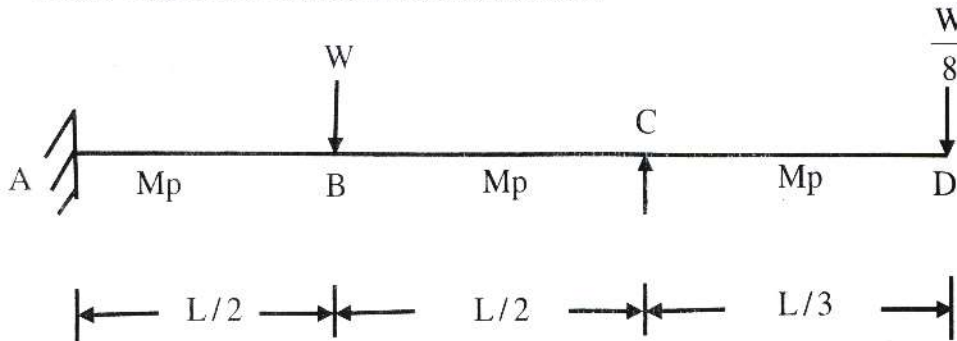
**UNIT-I**

- Q.1 (a) Find shape factor for triangular section. [4]
- (b) An unsymmetrical rectangular frame is loaded as shown in figure. Analyze the frame for collapse load and draw the bending moment diagram - [12]

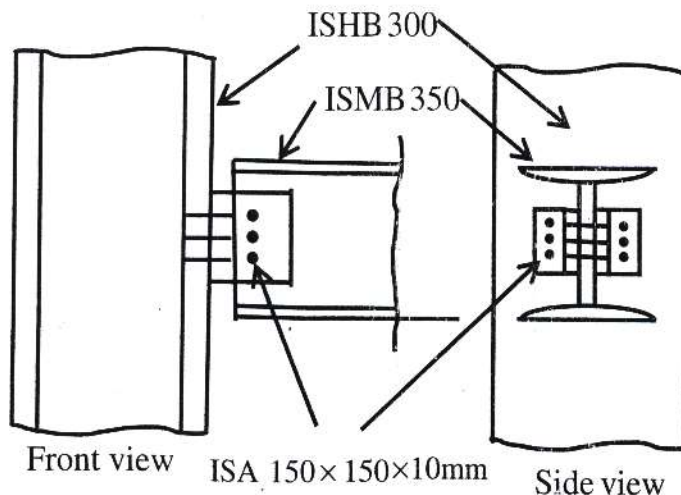


**OR**

- Q.1 (a) What are the three theorems of plastic analysis? [6]
- (b) A propped cantilever ABCD is loaded as shown in figure. Find the collapse load if the beam is of uniform cross section. [10]

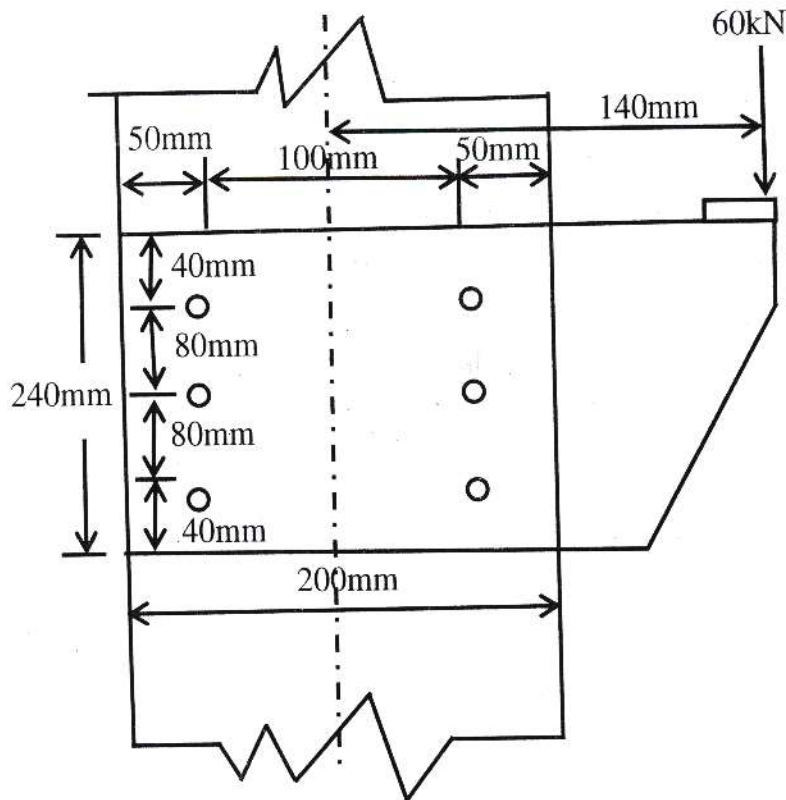
**UNIT- II**

- Q.2 (a) What is prying action? How it is accounted for? [4]
- (b) Two framing angles ISA 150mm × 150mm × 10mm are used to make beam to column connection. One angle is placed on either side of the web of the beam. Three bolts of 16mm diameter and of 4.6 grade are used to connect the angle legs to the beam web. Determine the reaction that can be transferred through the joint. Given, Column section ISHB 300 @ 618.03N/m  $t_f = 10.6\text{mm}$ . Beam section ISMB 350 @ 514.04 N/m  $t_w = 8.10\text{mm}$  [12]



**OR**

- Q.2 A plate bracket connection is as shown in figure. The factored load 60 kN is applied at an eccentricity of 140mm. There are 6 bolts of grade 4.6 of diameter 18mm, considering the heavily loaded bolt, find whether the connection is safe? [16]

**UNIT- III**

- Q.3 (a) Explain Lacing and Batten system in compression members. [6]  
 (b) Design a column to support a factored load of 1050 kN. The column has an effective length of 7.0 m with respect to z – axis and 5.0 m with respect to y – axis. Use steel Fe 410. [10]

**OR**

- Q.3 A built up section in a building consists of Two I-sections ISMB 300 placed side by side at centre to centre distance 225mm. Design end and intermediate batten plates, if the column is carrying an axial load of 850 kN and effective length of the column about both the axis is 5m. [16]

### UNIT- IV

- Q.4 (a) Differentiate between Web buckling and Web crippling. [6]
- (b) Design a laterally supported beam having effective span 6.0 m. The beam is simply supported at the two ends and carries a uniformly distributed factored load of 30kN/m, including its self-weight. [10]

#### OR

- Q.4 Design a laterally unsupported beam for the following data: [16]  
 Effective span = 4m, Maximum bending moment = 550 kNm, Maximum shear force = 200kN, Steel of grade Fe 410.

### UNIT- V

- Q.5 (a) Draw a neat diagram of Bolted gusset base. [4]
- (b) Design a slab base for a column consisting of a single ISHB 300 @ 0.577 kN/m and carrying an axial load of 1600 kN (factored). The column is to be supported on a concrete footing with permissible bearing pressure 4 N/mm<sup>2</sup>. [12]

#### OR

- Q.5 An axially loaded column carrying a factored load of 5500 kN, comprises of section ISHB 450 with one cover plate of size 400mm × 20mm on each flange. Design the gusseted base for the column. M10 plain concrete will be provided under base plate. [16]



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**7E7063****B. Tech. VII Sem. (Main / Back) Exam., Nov. – Dec. - 2018****Civil Engineering****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 : 6 (2000) \_\_\_\_\_

3. IRC : 21 (2000) \_\_\_\_\_

4. IS : 3370 (Part – I, &amp; IV) \_\_\_\_\_

**UNIT- I**

Q.1 (a) Write the methods of Prestressing and explain the Freyssinet system with neat sketch. [8]

(b) What do you understand by various losses in Prestressing? Explain in brief. [8]

**OR**

Q.1 A prestressed concrete beam (400 mm × 600 mm) in section has a simple supported span of 6m. The beam is subjected to a u.d.l. of 16 kN/m (inclusive of self-weight). The effective pre-stressing force of 960kN is provided through prestressing straight tendons located at 200mm from soffit (lower third point). Determine the extreme fibre stresses in concrete at the mid span section. Give the neat sketch of the problem. [16]

**UNIT- II**

- Q.2 (a) Describe the terms “Primary torsion” and “Secondary torsion”. [8]
- (b) Explain the concept of redistribution of moment. Also describe any two advantages of redistribution of moment in the design of statically indeterminate structures. [8]

**OR**

- Q.2 Design a continuous beam of a multistory building of three spans, each of 8 m center to center. The characteristic superimposed dead load including self-weight is 15 kN/m and characteristic live load is 13 kN/m. Design the critical section of rectangular beam by Limit State Method of design by assuming M-20 and Fe-415. Adopt width of beam 300 mm. Also design shear reinforcement using 8 mm diameter, two legged vertical stirrups. Also apply check for deflection. [16]

**UNIT- III**

- Q.3 (a) Differentiate between “membrane theory” and “beam theory” of analysis of shell structures. [8]
- (b) Develop the expression for meridional thrust in a circular dome for uniformly distributed load as per unit area of the surface. [8]

**OR**

- Q.3 Design a rectangular water tank resting on ground having base area of 4m × 6m. The height of water tank is 3.75m and keep a free board of 0.15m. Assume M-25 Grade of concrete and Fe-415 steel. Assume appropriate data and clearly state the assumptions. [16]

### UNIT- IV

- Q.4 (a) What are the characteristics of Yield Line Theory? Also explain the concept of Yield Line Theory. [8]
- (b) What is structural difference between a cantilever and a counterfort retaining wall? [8]

### OR

- Q.4 Calculate stability and design the vertical wall and heel slab only for a cantilever type retaining wall of height 4 m above ground level and overall height from the bottom of the footing is 5.0 m. Consider following data: [16]

- (a) Unit weight of soil =  $15 \text{ kN/m}^3$
- (b) Angle of repose,  $\phi = 30^\circ$
- (c) Bearing Capacity of soil =  $150 \text{ kN/m}^2$
- (d) Coefficient of Friction between soil and base slab  $\gamma = 0.50$
- (e) Concrete grade M – 20 and steel Fe – 415

Assume all other data and clearly state your assumptions.

### UNIT- V

- Q.5 (a) What is criteria for economical span length in bridges? [8]
- (b) Explain the Box culvert bridge. Also explain the importance of hydraulic factors in bridge design. [8]

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OR

Q.5 Design a R.C.C deck slab culvert for the following data –

[16]

Clear span = 5.8 m

Kerb Width = 22.50 m

Carriage Way = 7.50 m

Width of piers = 560 mm

Wearing coat = 75 mm

Foot path = No

Concrete = M – 25

Steel = Fe – 415

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7E7064

**7E7064****B. Tech. VII Sem. (Main / Back) Exam., Nov. – Dec. - 2018****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.*

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

1. NIL2. NIL**UNIT- I**

Q.1 (a) Describe the requirements for an ideal permanent way. Also sketch the neat diagram of Permanent way. [8]

(b) State the classification of gradients and explain each in detail. [8]

**OR**

Q.1 (a) Write the design parameter of marshalling yard. Define the different types of marshalling yards. Give a sketch of a marshalling yard. [8]

(b) Discuss different types of rail section used on B. G. and M. G. in India. Mention the relative merits and demerits of any two of them. [8]

## UNIT- II

Q.2 Explain in brief –

[8×2=16]

- (a) Symmetrical Split
- (b) Diamond Crossing
- (c) Scissors Crossover
- (d) Single Slip and Double Slip
- (e) Gauntlet Track & Fixed Point System
- (f) Gathering Lines
- (g) Triangle
- (h) Double Junction

### OR

- Q.2 (a) What are the different types of stress induced in railway track? [8]
- (b) Discuss the objectives of Urban Transport. Explain the major issues relating to the development of the Metropolitan transport system. [8]

## UNIT- III

- Q.3 (a) What are the objects of providing transition curves? Explain briefly the essential requirements of an ideal transition curve. [8]
- (b) Explain Grade compensation and its necessity at curves. What should be the allowable ruling gradient, if the ruling gradient is 1 in 150 on a particular section of B. G. and at the same time a curve of 4 degree is situated on this ruling gradient. [8]

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**OR**

- Q.3 (a) Explain the terms 'Super elevation' and 'Cant deficiency' in brief. Also write the limits of Super elevation and Cant deficiency for Indian Railway. [8]
- (b) If a 8 degree curve of track diverges from a main curve of 5 degree in an opposite direction in the layout of B. G. yard, calculate the super elevation and the speed on the branch line, if the maximum speed permitted on the main line is 45 kmph. [8]

**UNIT- IV**

- Q.4 (a) Write a brief note on "Airport Classifications". [8]
- (b) What is Wind Rose diagram? Explain briefly with a neat sketch any one method of orientation of runway. [8]

**OR**

- Q.4 (a) Enlist the various factors considered for the airport site selection. Explain any five important factors in brief out of the various factors listed. [8]
- (b) Explain the factors controlling taxiway layout and turn around taxiway. [8]

**UNIT- V**

- Q.5 (a) Write detail note on the various methods for designing flexible airport pavements. [8]
- (b) What are the various factors to be considered in airport pavement design? Discuss the significance of each. [8]

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OR

Q.5 (a) What are imaginary surface? Explain in detail. [8]

(b) Explain ESWL method of designing of rigid pavement. [8]

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7E7065

B. Tech. VII Sem. (Main / Back) Exam., Nov. – Dec. - 2018

Civil Engineering

7CE5A Application of Numerical Methods in Civil Engineering

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. NIL2. NIL**UNIT-I**Q.1 (a) Convert  $(0.859375)_{10}$  to the corresponding binary fraction. [8]

(b) What is meant by absolute and relative errors? If -

$$y = \frac{0.31x + 2.73}{x + 0.35}$$

Where the coefficients are rounded-off, find the absolute and relative errors in y

when  $x = 0.5 \pm 0.1$ . [8]**OR**

Q.1 (a) Explain errors and their types in numerical methods. [8]

(b) Calculate the value of  $\sqrt{102} - \sqrt{101}$  correct to four significant figures. [8]

**UNIT- II**

- Q.2 (a) Find a real root of the equation  $x^3 - 2x - 5 = 0$  by Bisection method correct upto two decimal places. [8]
- (b) Using Newton – Raphson method, find root of the equation  $x \sin x + \cos x = 0$ . [8]

**OR**

- Q.2 (a) Find root of the equation  $x^2 + 4\sin x = 0$  by Regula Falsi method. [8]
- (b) Using successive iteration method, find root of the equation  $2x = \cos x + 3$  correct to three places of decimals. [8]

**UNIT- III**

- Q.3 (a) Reduce the matrix  $A = \begin{bmatrix} 2 & 1 & 3 \\ 4 & 7 & 13 \\ 4 & -3 & -1 \end{bmatrix}$  to the normal form and hence, find its rank. [8]
- (b) Use Gauss elimination to solve: [8]

$$2x + y + z = 10$$

$$3x + 2y + 3z = 18$$

$$x + 4y + 9z = 16$$

**OR**

- Q.3 Solve the system of equation: [16]

$$\begin{bmatrix} 1 & 2 & 3 \\ 2 & 8 & 22 \\ 3 & 22 & 82 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 5 \\ 6 \\ -10 \end{bmatrix}$$

Using the Cholesky method. Also determine  $A^{-1}$ .

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**UNIT- IV**

Q.4 (a) Starting with  $x^{(0)} = [0.5, -0.5, -0.5]^T$  and using Jacobi method, find the next three iterations for the system: [8]

$$4x + y + z = 2$$

$$x + 5y + 2z = -6$$

$$x + 2y + 3z = -4$$

(b) Write applications of system of equations in civil engineering. [8]

**OR**

Q.4 Using Gauss Seidel iterative method solve the following system of equations: [16]

$$27x + 6y - z = 85$$

$$6x + 15y + 2z = 72$$

$$x + y + 54z = 110$$

**UNIT- V**

Q.5 (a) Given the data points (0,1), (1,3), (2,7) and (3,13) satisfying the function  $y = f(x)$ , compute  $f(0.5)$  using Newton's forward interpolation formula. [8]

(b) Using Newton's divided difference formula find  $f(x)$  as a polynomial in  $x$ , from the following table: [8]

x	f(x)
-1	3
0	-6
3	39
6	822
7	1611

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ORQ.5 Given the following values of  $f(x)$  and  $f'(x)$ 

[16]

x	-1	0	1
f(x)	1	1	3
f'(x)	-5	1	7

Estimate the value of  $f(-0.5)$  and  $f(0.5)$  using the Hermite interpolation.

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7E7066

B. Tech. VII Sem. (Main / Back) Exam., Nov. – Dec. - 2018

Civil Engineering

7CE6.1A Advance Transportation Engineering

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. Graph Paper \_\_\_\_\_

2. NIL \_\_\_\_\_

**UNIT- I**

- Q.1 (a) Enumerate any six applications of origin and destination (O & D) study. Explain the procedure "Road side interview method" used for O & D study. [3+5=8]
- (b) Describe any six uses of traffic volume studies. Describe the procedure of manual method used for traffic volume studies. Define Annual Average Daily Traffic (AADT). [3+3+2=8]

**OR**

- Q.1 (a) What are the uses of Spot Speed Study? Explain the method "Floating Car or Riding Cheek method" used for Speed and Delay study. [8]
- (b) Discuss comparative merits and demerits of On-street and Off-street parking. Describe the layout plain of various types of On-street parking with the help of sketches and also write the formula to calculate number of parking spaces (N) in a kerb length of L. [8]

**UNIT- II**

Q.2 (a) Define mean, standard deviation and variance used in statistical analysis. [3]

(b) The occupancy of parking spaces in a parking lot consisting of 50 spaces is shown below. The count was taken as 15 minute intervals during 4 hours duration between 11:00 AM to 3:00 PM on 6 week days (Monday to Saturday). Find by inspection whether the number of vacant spaces during any count follow a Poisson distribution. [13]

Occupancy of Parking Spaces	50	49	48	47	46	45	44	43	42	41	40 and less
Frequency	6	15	21	20	15	10	5	2	1	1	0

**OR**

Q.2 (a) Define "Sampling theory and significance of testing". [3]

(b) The speed and concentration of vehicles in a traffic stream were observed and following data were obtained: [13]

Concentration (Vehicle/km)	5	10	15	20	25	30	35	40	45	50
Speed (kmph)	72	68	61	52	47	39	33	27	20	13

Find the regression equation for determining the speed from concentration.

### UNIT- III

- Q.3 (a) Define Macroscopic and Microscopic parameters related to traffic stream. Describe all the three macroscopic parameters such as volume, speed, density and discuss relation between them. Also define Time Headway and Space Headway. [2+4+2=8]
- (b) Discuss all the four types of Road User Characteristics. [8]

#### OR

- Q.3 (a) Discuss various design factors of Rotary Intersection. Also draw labeled diagram of Rotary Intersection. [8]
- (b) The average normal flow of traffic on cross roads 1 and 2 during design period are 400 and 250 PCU per hour and saturation flow values on these roads are estimated 1250 & 1000 PCU per hour respectively. The all red time required for Pedestrian crossing is 12 sec. Design two phase signal with pedestrian crossing by Webster's method. [8]

### UNIT- IV

- Q.4 (a) Enumerate various types of traffic Islands on the basis of function. Describe about Divisional, Channelizing, Pedestrian Loading and Rotary islands. [8]
- (b) Discuss various regulations and ordinances for drivers. [8]

#### OR

- Q.4 (a) Discuss general features of regulatory signs. Draw sketches of any six types of regulatory signs. [2+6=8]



- (b) Write short notes on any four of the followings: [4×2=8]
- (i) One way street
  - (ii) Expressways
  - (iii) Kerb Parking Control
  - (iv) Road Markings
  - (v) Street lighting

### UNIT- V

- Q.5 (a) Describe the detrimental effects of traffic noise pollution on human health. Discuss the various techniques used to reduce the traffic noise pollution. [8]
- (b) Discuss effects of major air pollutants caused by traffic. Describe various measures for controlling air pollution. [8]

### OR

- Q.5 (a) Enumerate various road safety road safety equipments. How these equipments improve road safety, explain? [8]
- (b) Write short notes on the followings: [4×2=8]
- (i) Visual Intrusion and degrading the aesthetics
  - (ii) Measurement of noise levels
  - (iii) Generation of noise by road traffic
  - (iv) Road safety audit
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7E7068

Roll No. \_\_\_\_\_

Total No of Pages: 2**7E7068****B. Tech. VII Sem. (Main / Back) Exam., Nov. – Dec. - 2018****Civil Engineering****7CE6.3A Rural Water Supply & Sanitation****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. NIL2. NIL**UNIT- I**

- Q.1 (a) Discuss the importance of village community in India. [8]  
(b) Explain traditional sources of water in rural areas. [8]

**OR**

- Q.1 (a) Describe the condition of Indian villages with respect to social and health aspects. [8]  
(b) Explain with neat sketch working of hand pump. [8]

**UNIT- II**

- Q.2 (a) Write down various standards of water quality. [8]  
(b) Describe various measures to be taken in controlling communicable diseases. [8]

**OR**

- Q.2 (a) Describe various sources of communicable diseases. [8]  
(b) Explain the estimation of total water requirement. [8]

**UNIT- III**

- Q.3 (a) Describe slow sand filter and its working with a neat sketch. [8]  
(b) Explain how will you remove fluoride from water. [8]

**OR**

- Q.3 (a) Describe different schemes of rural water supply in Rajasthan. [8]  
(b) Explain horizontal roughing filter with a neat sketch. [8]

**UNIT- IV**

- Q.4 (a) Explain various tests for milk. [8]  
(b) Describe food poisoning. [8]

**OR**

- Q.4 (a) Explain life cycle of flies with a neat sketch. [8]  
(b) Explain various measures to be taken to control the mosquitoes. [8]

**UNIT- V**

- Q.5 (a) Explain pour flush latrines with neat sketch. [8]  
(b) Write down various problems of storm water and sludge. [8]

**OR**

- Q.5 (a) Write down the design steps of septic tank. [8]  
(b) Write short notes on - [4×2=8]  
(i) Biogas  
(ii) Soak pit