

KADI SARVA VISHWAVIDYALAYA
B.E. SEMESTER-VII EXAMINATION NOVEMBER-2016

Subject Code: CV-704-A

Date: 16/11/2016

Subject Name: Design of Special Structures I

Time: 10:30 a.m. To 01:30 p.m.

Total marks: 70

Instruction:

1. Answer each section in separate Answer Sheet.
2. Use of scientific calculator is permitted.
3. All questions are compulsory.
4. Indicate clearly the options you attempted along with its respective question number
5. Use the last page of supplementary for rough work.
6. Any codes or any material is NOT permitted. Assume other data if required.

Section I

Q.1

Marks

[15]

- a. Give full name of IS:3370 and also enlist its parts with name. (05)
- b. For underground tanks draw figures of horizontal earth pressure on tank showing formula of pressure at base and location of its CG for the following cases.
 - Case (a): Backfill is partially submerged
 - Case (b): Backfill consist of $c - \phi$ soil
- c. Derive the formula for the intensity of soil pressure at toe and heel from earth below them in form of total downward load, base width and eccentricity. (05)

OR

- c. Draw figure for cantilever retaining wall for no tension at base and derive the position of resultant for no tension at base. (05)

Q.2

[10]

- a. Calculate horizontal earth force at base of stem for the following data. (05)
 Height of the wall including thickness of base: 5m, Thickness of base: 1m, Surcharge pressure: 15 kN/m², Unit weight of soil: 18 kN/m², $K_a=1/3$.
- b. Calculate area of reinforcement required at 3m spaced supports in stem (05) for the following data.
 Height of the stem: 7.55m, Unit weight of soil: 16 kN/m², $K_a=1/3$.

OR

- Q.2** Draw reinforcement details for sectional top view for counterfort retaining wall. [10]
- Q.3** Draw reinforcement details of elevated water tank from top dome to bottom dome with all necessary connections. [10]

OR

- Q.3** [10]
- Explain construction joint with figure in water tank (05)
 - Calculate moment at connection of side walls for the portion to be designed as continuous frame for the empty condition for the following data.
- Size: 6m x 4m x 3.5m, free board: 150mm, γ_{sat} : 18 kN/m³, γ_w : 10 kN/m³, ϕ : 30°.

Section II

- Q.4** [15]
- i) Ratio of maximum basic wind speed to minimum basic wind speed given in IS 875 Part 3,1987 is _____ (05)
ii) Structure falls in category 2 according to IS 875 Part 3,1987, if height of the surrounding structures is between _____ and _____
iii) According to Indian standards IS 875 has _____ parts.
iv) IS 875 Part 2 is for _____ loads.
v) K_3 is _____ factor according to IS 875 Part 3,1987.
 - Calculate K_3 factor for slope of ground 10°, height of hill 900m, location from crest 200m down wind slope >3°, structure is on wind ward side. (05)
 - Enlist any two IS codes for design of silo. (05)

OR

- c. Enlist the factors on which K_1 depends as per IS: 875 Part 3, 1987. (05)
- Q.5** Find ratio of design wind speed for V_b 44 m/sec and V_b 47 m/sec at 10m, 15m, 20m, 30m, 50m and 100m for the following data. [10]
Life of building 100 years, Category 3, Class B, Plane with upwind

slope $< 3^\circ$.

OR

- Q.5** Find ratio of design wind speed for V_b 44 m/sec and V_b 39 m/sec at 10m, 15m, 20m, 30m, 50m and 100m for the following data. [10]

Life of building 100 years, Category 3, Class B, Plane with upwind slope $< 3^\circ$.

- Q.6** Draw schematic diagram for silo showing all components. [10]

OR

- Q.6** Explain behavior of silo with sketch. [10]

-----All the Best-----

TABLE 1 RISK COEFFICIENTS FOR DIFFERENT CLASSES OF STRUCTURES IN DIFFERENT WIND SPEED ZONES
(Clause 5.3.1)

CLASS OF STRUCTURE	MEAN PROBABLE DESIGN LIFE OF STRUCTURE IN YEARS	k_1 FACTOR FOR BASIC WIND SPEED (m/s) OF					
		33	39	44	47	50	55
All general buildings and structures	50	1.0	1.0	1.0	1.0	1.0	1.0
Temporary sheds, structures such as those used during construction operations (for example, form-work and falsework), structures during construction stages and boundary walls	5	0.82	0.76	0.73	0.71	0.70	0.67
Buildings and structures presenting a low degree of hazard to life and property in the event of failure, such as isolated towers in wooded areas, farm buildings other than residential buildings	25	0.94	0.92	0.91	0.90	0.90	0.89
Important buildings and structures such as hospitals communication buildings / towers, power plant structures	100	1.05	1.06	1.07	1.07	1.08	1.08

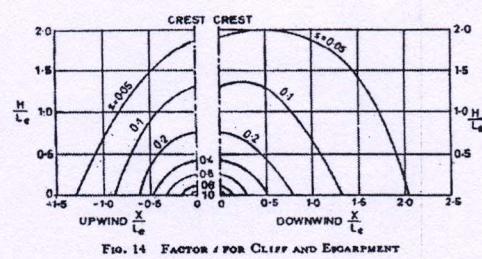
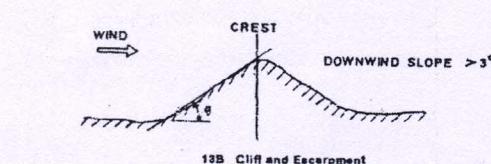
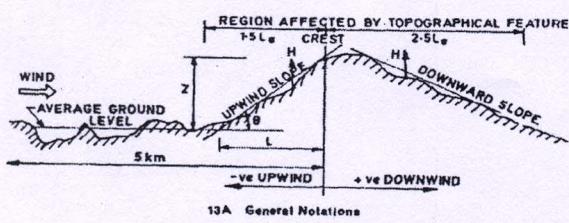


FIG. 14 FACTOR s FOR CLIFF AND ESCARPMENT

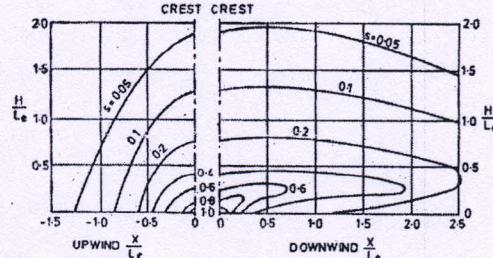


FIG. 15 FACTOR s FOR RIDGE AND HILL

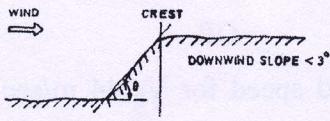


FIG. 13 TOPOGRAPHICAL DIMENSIONS

**TABLE 2 k , FACTORS TO OBTAIN DESIGN WIND SPEED VARIATION WITH HEIGHT IN DIFFERENT TERRAINS FOR DIFFERENT CLASSES OF BUILDINGS/STRUCTURES
(Clause 5.3.2.2)**

HEIGHT m	TERRAIN CATEGORY 1 CLASS			TERRAIN CATEGORY 2 CLASS			TERRAIN CATEGORY 3 CLASS			TERRAIN CATEGORY 4 CLASS		
	A	B	C	A	B	C	A	B	C	A	B	C
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
10	1.05	1.03	0.99	1.00	0.98	0.93	0.91	0.88	0.82	0.80	0.76	0.67
15	1.09	1.07	1.03	1.05	1.02	0.97	0.97	0.94	0.87	0.80	0.76	0.67
20	1.12	1.10	1.06	1.07	1.05	1.00	1.01	0.98	0.91	0.80	0.76	0.67
30	1.15	1.13	1.09	1.12	1.10	1.04	1.06	1.03	0.96	0.97	0.93	0.83
50	1.20	1.18	1.14	1.17	1.15	1.10	1.12	1.09	1.02	1.10	1.05	0.95
100	1.26	1.24	1.20	1.24	1.22	1.17	1.20	1.17	1.10	1.20	1.15	1.05
150	1.30	1.28	1.24	1.28	1.25	1.21	1.24	1.21	1.15	1.24	1.20	1.10
200	1.32	1.30	1.26	1.30	1.28	1.24	1.27	1.24	1.18	1.27	1.22	1.13
250	1.34	1.32	1.28	1.32	1.31	1.26	1.29	1.26	1.20	1.28	1.24	1.16
300	1.35	1.34	1.30	1.34	1.32	1.28	1.31	1.28	1.22	1.30	1.26	1.17
350	1.37	1.35	1.31	1.36	1.34	1.29	1.32	1.30	1.24	1.31	1.27	1.19
400	1.38	1.36	1.32	1.37	1.35	1.30	1.34	1.31	1.25	1.32	1.28	1.20
450	1.39	1.37	1.33	1.38	1.36	1.31	1.35	1.32	1.26	1.33	1.29	1.21
500	1.40	1.38	1.34	1.39	1.37	1.32	1.36	1.33	1.28	1.34	1.30	1.22

NOTE 1 — See 5.3.2.2 for definitions of Class A, Class B and Class C structures.

NOTE 2 — Intermediate values may be obtained by linear interpolation, if desired. It is permissible to assume constant wind speed between 2 heights for simplicity.

KADI SARVA VISHWAVIDHYALAYA

BE SEMESTER: 7TH

EXAMINATION (NOVEMBER 2016)

SUBJCT CODE: CV 704-B

SUBJECT NAME: URBAN TRANSPORTATION SYSTEM

DATE: 16 /11/2016

TIME: 10:30 am TO 1:30 pm

TOTAL MARKS: 70

INSTRUCTIONS:

1. Answer each section in separate Answer book
2. Use of scientific Calculator is permitted.
3. All questions are compulsory.
4. Indicate clearly the options you attempted along with its respective question number.
5. Use the last page of main supplementary for rough work.

SECTION: I

Q : 1 (ALL COMPULSORY)

- (A) Explain the problems in the urban transportation in the present scenario of high vehicle ownership. Which are the measures to meet it? 05
(B) Define : Desire line, Travel time, Modal split, Forecasting, Non-home based trip 05
(C) What is sampling? Discuss various types of samplings. 05

OR

- (C) Explain 1) Rectangular street system with sketch 2) Concentric and radial street system with sketch 05

Q : 2 Answer the following questions.

- (A) Which type of data and maps are required for master plan. 05
(B) Write short note on : Human Settlement 05

OR

- Q : 2 (A) Which type of Road inventory data and traffic data are required for transportation planning 05
(B) List out different types of surveys required for planning? Explain any two in detail. 05

Q : 3 Answer the following questions.

- (A) What are the factors affecting travel demand? 05
(B) Define :Parking volume, Parking duration, Parking index, Parking turn-over 05

OR

- Q : 3 (A) Stages involved in urban transport planning process. 05
(B) Explain the basic structure of transportation system. 05

SECTION: II

Q : 4 (ALL COMPULSORY)

- (A) Develop the trip generation equation from the following data:

10

No. of persons in household	Vehicle ownership	Trips per day
5	2	4
4	2	4
3	2	3
1	0	2
2	1	1
6	3	7
8	3	9
9	4	8

- (B) Write short note on : opportunity model

05

OR

- (B) What are the factors influencing on individual choice of travel mode? 05

Q : 5 Answer the following questions.

- (A) A Study area has been divided in four zones A,B,C and D. The results of the trip generation analysis and the present trip distribution matrix is included in the following tables:

		A	B	C	D
Produced trips	Present	150	90	180	80
	Future	300	170	270	240
Attracted trips	Present	120	100	150	130
	Future	180	300	300	200

The distribution matrix(Present)

D O \\	A	B	C	D
A	40	40	40	30
B	20	20	30	20
C	40	30	50	60
D	20	10	30	20

Develop future distribution of trip matrix using Uniform growth factor method

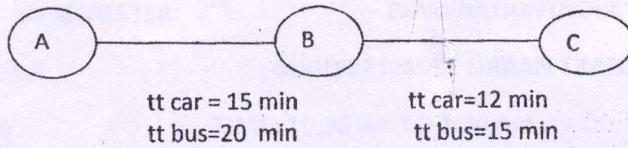
- (B) Solve above example by Detroit method.

05

OR

- Q : 5 (A) Differentiate between Trip end models and Trip interchange models** 05

- (B) The probability of choosing the car mode (P_c) is found to be given, $P_c=1/(1+e^{-u(x)})$. Where, $u(x)=0.70-0.04(ttcar - ttbus)$. The total trip exchanges between zones are as follows. Determine the two way volume in cars per day on the roads AB and BC and if the average car occupancy is 1.6



From	To	Persons tips/day
A	B	1200
B	A	0
A	C	800
C	A	1600
B	C	900
C	B	800

Q : 6 Answer the following questions.

- (A) Give advantages and disadvantages of mass transit system 05
(B) Write short note on : Metro trains 05

OR

Q : 6 (A) Explain by drawing sketch typical corridor components? 05

- (B) What is the purpose of route assignment? Explain factors affecting route assignment?

KADI SARVA VISHWAVIDYALAYA

B.E CIVIL SEMESTER 7th EXAMINATION (DECEMBER /2015)

SUBJECT CODE: CV-704 SUBJECT NAME: URBAN TRANSPORTATION SYSTEM

DATE: 1ST DECEMBER, 2015 TIME: 10.30 am to 1.30 pm TOTAL MARKS: 70

Instructions:

1. Answer each section in separate Answer Sheet.
2. Use of scientific Calculator is permitted.
3. All questions are compulsory.
4. Indicate **clearly**, the options you attempted along with its respective question number.
5. Use the last page of main supplementary for rough work.

Section - 1

Q1 [A] What are the roles of transportation in society? Describe economic and social function of transportation. 05

[B] Define the terms :- (i) Trip (ii) CBD (iii) Accessibility (iv) Origin & destination (v) Base year. 05

[C] Explain Trips end model and Trip interchange model with formula 05

OR

[C] Explain different levels of urban Transportation Planning stages of with sketch 05

Q2 [A] Explain the factors affecting the trip generation and attraction rates. 05

[B] Explain Environment–Land use and transportation System. 05

OR

[A] Which are the methods of O-D Survey? Describe in detail any one method. 05

[B] What is zoning? Which are the points to be kept in mind while Zoning? 05

Q3 [A] What is corridor? Explain by drawing sketch typical corridor component. 05

[B] The following data is collected for a town: 05

Zone	1	2	3	4	5	6	7
Population in Zone	24	18	28	23	16	17	21
Total trips generated	14	11	17	12	11	13	14

Develop a linear regression model for trips generated from a zone. If the

population in particular zone increases to 86500, predict expected trip generation

OR

- [A] What do you mean by route assignment? What are the purposes of route assignment? Explain the factors affecting Route Assignment.
- [B] A study area has been divided into four zones 1,2,3,4 the present trip distribution matrix is given. Total future trip produced and attracted is also given

D O	1	2	3	4	Total present produced	Total future trips
1	-	45	55	35	135	300
2	45	-	65	25	135	375
3	20	60	-	45	125	280
4	55	70	35	-	160	225
Total present attracted trips	120	175	155	105	555	-
Total future attracted trips	210	475	335	160	-	1180

Determine future trip distribution matrix using **Average Growth factor**. Iteration process is not necessary.

Section – 2

- Q4. [A] What do you mean by Mass Transit system? Explain its purpose along with its merits and demerits.
- [B] Enlist different Growth Factor Models for trip distribution, explain any two in detail.
- [C] Which are the Urban Forms? Describe the characteristics of each related to transportation planning.

OR

[C] Define: 1) Study area 2) Intrazonal trip 3) Cordon line 4) Screen line 5) Horizon year. 05

Q5 [A] The following data shows the average household size and total trips made per day for a particular zone of study area. Develop the trip production equation and check its validity. 05

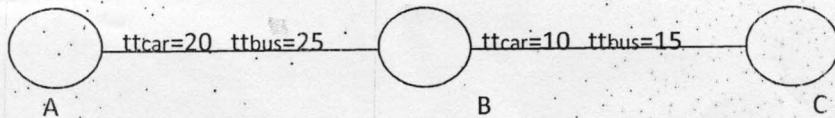
Average Household size	Total trips made per day
3	5
4	7
5	8
6	9
7	11

[B] Briefly explain the Moore's algorithm of route assignment analysis. 05

OR

[A] Explain aggregate and disaggregate approaches to travel demand. 05

[B] Three zones A,B & C are connected by two lanes roads as shown in fig. below with travel time by bus shown in bracket and travel time by car. The probability (P_c) of choosing the car mode is found to be given by: 05



$P_c = \frac{1}{1 + e^{-u(x)}}$, where $u(x) = 0.86 - 0.08(tt_{car} - tt_{bus})$. The total trips generated is as:

From A to B: 1200, B to A: 0, A to C: 500, C to A: 1800, B to C: 400, C to B: 500.

Determine the 2 way volume in car per day on the road AC if average car occupancy is 2.5

Q6 [A] Explain Para transit systems. 05

[B] Enlist various types of transportation surveys to be carried out for planning process. Explain any one. 05

OR

[A] What do you mean by master plan? What are the features included in the preparation of master plan. 05

[B] Give the advantages and disadvantages of BRTS. 05

KADI SARVA VISHWAVIDYALAYA
B.E. (Civil) Semester-VII Examination, November 2015

Subject Code: CV-704

Date: 01/12/2015 Time: 10:30 am to 1:30 pm

Subject: Design of Special Structure-I

Total Marks: 70

Instructions:

- (1) Answer each section in separate answer sheet
- (2) All questions are Compulsory
- (3) Use of IS:456, IS:3370 and IS:875 are permitted, assume other required data.
- (4) Indicate clearly, the options you attempt along with its respective questions number.
- (5) Use the last page of main supplementary for rough work

Section-I

Q-1 (All Compulsory)

- (A) Estimate wind forces for a water tank for the following data. [10]
Height of the supporting shaft=14 m ,
Height of the bottom conical portion= 2 m ,
Height of cylindrical portion = 4 m and
Rise of top spherical dome= 1.5 m,
Diameter of supporting shaft= 4 m and
Diameter of cylindrical portion= 10 m, location is Bhuj, Terrain Category= II and class= B, Ground slope= 1 vertical to 7 horizontal, hill height= 280 m, location from crest 100 m windward, Design life 100 years.
- (B) Fix the basic dimensions of Intz type container of an elevated water tank to [5] store 10 lacs liter of water and design the top dome.

OR

- (B) Explain the state stability criteria for counterfort retaining wall. [5]

Q-2 Answer the following Questions

- (A) A cylindrical silo has an internal diameter of 6m and 25m deep (cylindrical portion) with a conical hopper bottom. The material stored is wheat with a density of 12 KN/m³. The coefficient of friction between wall and material is 0.54. The ratio of horizontal to vertical pressure is 0.40. Angle of repose = 22 degrees. Design the reinforcement in the silo walls. Adopt M20 grade concrete and Fe415 HYSD bars. [10]

OR

- (A) Explain the analysis and design of silo. [10]

Q-3 Answer the following Questions

- (A) Fix the basic dimensions of intz tank to store 5 lacs litre water. Height of the staging is 15 m up to the bottom of the tank. Design and detail i) cylindrical wall ii) conical dome. Use M30 & Fe415. [10]

OR

- (A) Design and detail the following components of overhead circular water tank supported on ring beam having capacity of 5 laces liters water. Assume diameter of tank 10m, height of dome is 1.5m and thickness of top dome as 100mm with LL is of 1.5 kN/m². Also assume width of top ring beam 230 mm. Design top spherical dome, top ring beam, and cylindrical wall. Show detailing of reinforcement. Use M25 grade of concrete and Fe415 steel. [10]

Section-II

Q-4

(All Compulsory)

- (A) For a rectangular water tank open at top resting on ground having size 4.0 m x 8.0 m x 3.0 m high, design short wall and long wall. Use M30 and Fe 415. [10]
(B) Explain the design steps of underground circular tank with flexible joint at base. [5]

OR

- (B) A circular water tank with fix base, 10m diameter and 8m height is provided at ground level. Calculate the thickness of cylindrical wall required & design the wall at bottom. Assume concrete grade M25 and Fe415 grade steel. [5]

Q-5

Answer the following Questions

- (A) For the cantilever retaining wall of height 5m, fix the basic dimensions of the various elements. Angle of repose of soil is 35° . SBC of soil is 200 kN/m^2 and density of soil is 18 kN/m^3 . Friction coefficient between soil and concrete is 0.50. Design heel of the retaining wall. Stability check for sliding and overturning are not required. [10]

OR

- (A) Design a heel (Retaining wall) of thickness of 400 mm and length of 1.65m for following load:
Total down ward pressure = 90 kN/m^2
Total upward pressure = 70 kN/m^2 near connecting end and 18 kN/m^2 at far end. Use M20 – Fe 415. [10]

Q-6

Answer the following Questions

- (A) Design and detail a stem (only) of cantilever retaining wall to retain the earth 6 m high. The top surface is horizontal behind the wall. The unit weight of soil is 17 kN/m^3 and angle of internal friction is 30° . The bearing capacity is of 180 kN/m^2 and coefficient of friction between base and soil is 0.55. Use M20 – Fe 415. Assume depth of foundation is as 1.0 m. Also carry out stability checks. [10]

OR

- (A) Fix the basic dimensions of retaining wall with the following data: Angle of repose = 33° , Unit weight of the soil = 16 KN/m^3 , height of wall above ground level = 7.0 m, safe bearing capacity of the soil = 190 KN/m^2 , coefficient of friction between the base and the soil is 0.45, Design stem slab only and Provide all necessary checks. Use M20 & Fe 415. [10]

***** All the Best*****