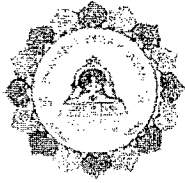


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BHARATIYA VIDYA BHAVAN'S

SARDAR PATEL COLLEGE OF ENGINEERING

Munshi Nagar, Andheri(West), Mumbai 400 058

(A Government Aided Autonomous Institute)



RE-EXAMINATION

T.Y. B.Tech. Civil sem VI

Duration: 3 hours Geotechnical Engg - II dt. 6.1.16

Marks: 100

Course: CE 351(Geotechnical Engineering - II)

Class/Branch: T. Y. B. Tech (Civil)

Semester: VI

Note:

- Question 1 is compulsory.
- Attempt **any four** out of remaining six questions.
- Assume suitable data if required.
- Figures to right indicate full marks.
- Answers to all sub-questions should be grouped together.

Master File

- a) State the method of estimating the capacity of piles by dynamic formulae. Also state their limitations. (05)
 - b) Explain direct shear, local shear and punching mode of failure in shallow foundations. (05)
 - c) Write a short note on the use of geosynthetics as a reinforcing material (05)
 - d) Compare Rankine's and Coulomb's earth pressure theories. (05)
- a) A group of 16 piles having a diameter of 300 mm are placed 1.2 m center to center. The piles are placed in clay (cohesion 32 kN/m^2) and are 10 m long. Determine the ultimate bearing capacity of the pile group if end bearing is neglected and adhesion factor is assumed to be 0.64 (10)
 - b) State clearly the difference between at rest, active and passive pressure (05)
 - c) Differentiate between deep and shallow foundations (05)
- a) Describe in detail the various methods of classification of pile foundations (05)
 - b) Importance of groundwater level while determining the bearing capacity of shallow foundations. (05)
 - c) Explain the various causes of differential settlement (05)
 - d) Describe the process for Rehmann's construction of active pressure (05)
- a) State the procedure for conducting a plate load test as per IS 1888 (10)
 - b) Explain the importance of negative skin friction in pile capacity. (05)
 - c) A retaining wall is 6m high and retains dry sand with $\phi=34^\circ$. If the top 3m of sand has $\gamma (\text{kN/m}^3) = 20.6$ and below that is $\gamma (\text{kN/m}^3) = 22.7$, calculate the magnitude and point of application of the resultant active earth pressure. (05)

- 5 a) A wall footing is to rest on a soil having the following properties: (10)
 c (kN/m^2) = 31, ϕ (degrees) = 34, γ_d (kN/m^3) = 19.2 and γ_{sat} (kN/m^3) = 20.8.
 Determine the safe load on a 1.5m wide footing placed at 1.2 m below the ground surface if water table is located at 1.8 m below ground surface. Use IS code recommendations and neglect depth factors. Assume FOS as 2.5
- b) Describe in detail the various methods of classification of pile foundations (05)
 c) Explain how geotextiles are stored, handled and placed. (05)
- 6 a) Derive an expression for load on a ditch conduit. (10)
 b) Explain the factors associated with minimum depth of a shallow foundation. (05)
 c) Explain the construction of an imperfect ditch conduit (05)
- 7 a) Derive an expression for factor of safety of a retaining wall against overturning (10)
 b) A 500 mm diameter pile is driven into a sandy deposit having a friction angle of (10)
 32 degrees, γ_b (kN/m^3) = 18.6 and γ_{sat} (kN/m^3) = 20.5. Considering $N_q = 29$ k=1.2 and $\delta = 0.67\phi$, calculate the ultimate load the pile can carry if the ground water is 3 m below ground surface and the pile is 8m long.

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T.Y.B.Tech. Civil - Sem V

Entrepreneurship & Management

BHARATIYA VIDYA BHAVAN'S

SARDAR PATEL COLLEGE OF ENGINEERING

Munshi Nagar, Andheri (West), Mumbai 400 058

(A Government Aided Autonomous Institute)

END SEMESTER

Nov-Dec 2015



Duration: 3 hours

Marks: 100

Class/Branch: T.Y B.Tech (Civil)

Semester: V

Name of the Course: Entrepreneurship & Management

Programme: Civil Engineering

Course Code: CE306

Note:

Master file.

- Attempt any five questions.
- Assume suitable data if required.
- Answers to all sub-questions should be grouped together.

Q.1. a) Discuss the concept of Entrepreneur and Entrepreneurship? Also explain the difference between them? (10 M)

b) Critically examine the following sentence in 250 words "Entrepreneurship is the driving force of Economical development of India" (10 M)

Q.2. a) Define: Entrepreneurial Culture & Discuss the factors affecting the Entrepreneurship Process? (10 M)

b) List out socio economic origins of Entrepreneur & Discuss the Barriers affecting the Entrepreneurship Process? (10 M)

Q.3. a) Discuss the various classifications of entrepreneurs along with one example. (10 M)

b) Discuss the Maslow's Need for hierarchy Theory of Motivation. Also explain how to incorporate its principles in regular business. (10 M)

Q.4. a) Define: Finance. State the different types finance required & its Sources exist in India for development of Small scale Industries. (10 M)

b) "Small a scale industry plays a vital role in the developing country like India" Discuss the above sentence with its features in 250 words. (10 M)

Q.5. a) Discuss various steps/types of Project Appraisal. Also explain different types of organizational structures exist in every company. (10 M)

b) An initial investment in plant & machinery of ₹ 32000 is expected to generate cash flows of ₹ 2362, ₹ 2222, ₹ 3850, ₹ 4230 at the end of first, second, third & fourth year respectively. At the end of fourth year machines will be sold for ₹ 450 as salvage value. Calculate the net present value of the investment if the discount rate is 9.5%. (06M)

c) Define: Payback Period. An investment of Rs. 300000 is expected to generate the following cash flows in six years. Calculate payback period of the investment. Should the investment be made if company wants to recover the initial investment in 4 years? Solve by Unrecovered investment method & cumulative net cash flow. (04 M)

Year	Net Cash Flow in (Rs.)
1	40K
2	65K
3	63K
4	85K
5	55K
6	65K

Q.6. a) Journalize the following transactions in the books of Mr. Deo for Dec 2015. (06 M)

b) Also post them in ledger book: (08 M)

c) Also prepare its Trial Balance; Profit & Loss & Trading statement & Balance sheet (06 M)

Date	Transactions	Amount
1	He started the business with cash ,	200000
3	Sold goods to Mr.sachin for cash .	1800
12	Purchased goods on credit from manoj .	34000
16	Paid office rent by cheque of Bank of Maharashtra .	4800
15	Paid commission to Kaushal .	600
22	Deposited money in bank of MAHARASHTRA .	32000
24	Returned goods to Mr.Rahim .	2000

Q.7. a) Which principle of management envisages that each group of activities having the same objectives must have one head and one plan? Explain the principles with a suitable example. (10 M)

b) "Hardly a competent workman can be found who does not devote considerable amount of time to studying just how slowly he can work & still convince his employer that he is going at good pace" Discuss the Fredrick Taylor's above quote with its principles of management.

(2)

(10 M)

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26-11-15



T.Y.B.Tech. (Civil) Sem V
Transportation Engg.

Bharatiya Vidya Bhavan's
Sardar Patel College of Engineering
MUNSHI NAGAR, ANDHERI (WEST), MUMBAI-400 058.



Nov. 2015

End Semester Examination

T. Y. B. Tech. Civil (Sem - V)

Marks: 100

Course Name – Transportation Engineering – I (CE-305)

Duration: 3 Hr.

Note:

- (i) assume suitable data if required
(ii) Question one is compulsory, solve any four Questions out of remaining six

Master file

Q.1. Solve any four (5x4)

(20)

- (i) Explain with sketch how the movement of aircraft can control in space.
(ii) Discuss with Sketch Take off climb surface and Approach surface.
(iii) Discuss why uniformity of gauge is required.
(iv) Discuss various factors affecting selection of site for Harbour.
(v) Distinguish between "wet docks" and "dry docks"
(vi) Explain with sketch left and right hand turnout

Q.2.

(a) Write short notes on

(5x2)

- (i) Necessity of Airport Drainage system
(ii) Airport Marking & Airport Lighting

(b) The average wind data collected at particular site is given bellow. Determine calm period, orientation of runway and wind coverage. Assume permissible cross wind component = 25 km/hr. plot wind rose diagram considering

(10)

- (i) Direction, duration and intensity of wind
(ii) If another runway is oriented at right angle to above runway than what will be wind coverage.

Wind direction	Duration of wind in percentage		
	6.4 to 25 km/hr	25 to 50 km/hr	50 to 75 km/hr
N	4.5	1.3	0.1
NNE	3.3	0.8	0
NE	1.8	0.1	0
ENE	2.7	0.3	0
E	2	0.4	0
ESE	5.3	0.1	0
SE	6.3	3.2	0.1
SSE	7.4	7.7	0.3
S	4.6	2.2	0
SSW	2.4	0.9	0
SW	1.1	0.1	0
WSW	3.6	0.4	0
W	1.8	0.3	0
WNW	5.9	2.6	0.2
NW	5.8	2.4	0.2
NNW	6.8	4.9	0.3

Q.3 Transportation Engg - Dt - 26/11/15

- (a) Using the sleeper density of $(n + 5)$ estimate the number of rails, sleepers, fish plates, fish bolts and Ballast required for construction of 1 km long (i) broad gauge (ii) meter gauge railway track. (10)
- (b) A 5° curve diverges from 2° main curve in reverse direction in a layout of broad gauge yard. If the speed on branch line is restricted to 85 km/hr. determine the restricted speed on main line. (10)

Q.4.

- (a) Derive the relationship between superelevation, speed, Gauge and radius of circular curve. What are its limiting values for different gauges. (10)
- (b) What is transition curve why it is provided. How will you decide the length of transition curve. (10)

Q.5.

- (a) Write short notes on (12)
- (i) Tongue rail and stock rail
 - (ii) Theoretical nose of crossing and actual nose of crossing
 - (iii) Relationship between number of crossing, permissible speed and angle of crossing.
- (b) Calculate the elements required to set out 1 in 12 turnout, taking off from straight broad gauge track with its curve starting from toe of switch. Heel divergence = 11.4. (08)

Q.6.

- (a) Discuss the systematic approach for expansion of existing airport or construction of new airport. (10)
- (b) Design an exit taxiway joining runway and parallel main taxiway. The total angle of turn is 40° and turning speed 80 km/hr. draw a neat sketch showing all design elements. (10)

Q.7.

- (a) Write a note on water transportation and explain various modes of water transportation with block diagram. (10)
- (b) Explain the terms "Ballast" and "Keel". Also, discuss their functions. (10)

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T.Y.B.Tech.(Civil) Sem V

Hydraulic Engg - I



BHARATIYA VIDYA BHAVAN'S



SARDAR PATEL COLLEGE OF ENGINEERING

GOVERNMENT AIDED AUTONOMOUS INSTITUTE

ANDHERI (WEST), MUMBAI - 400 058.

End Semester Exam

Nov. - Dec. 2015

Max. Marks: 100

Duration: 3 hours

Class: T.Y. B.Tech. (Civil)

Semester: V

Name of the Course: Hydraulic Engineering-I

Program: Civil Engineering (UG)

Course Code: CE304

Instructions:

1. Question No. 1 (One) is compulsory.
2. Out of remaining questions, attempt any 04 (four) questions.
3. In all 5 (Five) questions to be attempted.
4. Draw neat diagrams
5. Assume suitable data if necessary

Master file.

Question No.

Max. Marks

- Q1 (a) What is siphon? Where is it used? Explain its working with neat sketch. (05)
- (b) What is meant by water hammer? Obtain an expression for the rise in pressure in a thin elastic pipe of circular section in which the flow of water is stopped by sudden closure of valve. (10)
- (c) Define: Specific speed of turbine and state its significance. (05)
- Q2 (a) A valve is provided at the end of a cast iron pipe of diameter 15 cm and of thickness 10 mm. Water is flowing through the pipe, which is suddenly stopped by closing the valve. Find the maximum velocity of water, when the rise of pressure due to sudden closure of valve is $200 \times 10^4 \text{ N/m}^2$. Take bulk modulus (K) for water as $19.62 \times 10^8 \text{ N/m}^2$ and elasticity modulus (E) for cast iron as $11.75 \times 10^{10} \text{ N/m}^2$. (08)
- (b) Three pipes joined in series release water from 75 meter level to 30 meter level. The details of piping system are as given in Table 1. Considering minor and major losses in pipes, determine; discharge, velocity and head loss in each pipe. (12)

Table 1

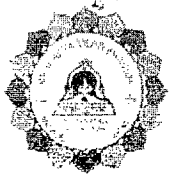
Pipe	Length (m)	Diameter (mm)	Friction Factor (f)
1	850	150	0.018
2	950	100	0.020
3	1000	150	0.018

1

T.Y.B.Tech. (Civil) Sem V

Hydraulic Engg - 1 Dt. 23/11/15

- Q3 (a) Explain: Angular momentum principle with an example. (04)
- (b) A pipe bend placed in a horizontal plane tapers from 30 cm diameter at inlet to 15 cm diameter at outlet. Water enters the reducing bend horizontally and gets turned through 45-degree in the clockwise direction. Observations indicate that when water flows at the rate of 200 liters/sec, the pressure of 40 kN/m^2 at the inlet section drops to 25 kN/m^2 at outlet section due to frictional effects. Find magnitude and direction of resultant force on the bend. (08)
- (c) Water is admitted at the axis of rotation of a two arm lawn sprinkler. The nozzles facing opposite each other's has a diameter of 10 mm each and sprinkler arm have a length of 250 mm, for the flow rate of 2.50 liters/sec. Find; (08)
- (i) Speed of rotation of sprinkler
- (ii) Torque to keep the sprinkler stationary.
-
- Q4 (a) Explain with neat sketch: Jet Propulsion of an orifice tank. (04)
- (b) Prove that the force exerted by a jet of water on a stationary semi-circular vane in the direction of the jet when the jet strikes at the centre of the semi-circular vane is two times the force exerted by the jet on the stationary flat plate. (08)
- (c) A jet of water strikes with 35 meter/sec velocity without shock on a series of vanes moving at 10 m/sec. The jet is inclined at an angle of 20° to the direction of motion of vanes. The relative velocity of jet at outlet is 0.85 times the value at inlet and the flow is radial. Determine; (08)
- (i) Vane angle at entrance and exit;
- (ii) Work done by the jet;
- (iii) Hydraulic efficiency of the system.
-
- Q5 (a) Explain in brief: Performance characteristics curves of hydraulic turbines. (06)
- (b) Derive an expression for work done and efficiencies of Francis turbine. Also draw velocity triangle. (08)
- (c) A Kaplan turbine operating under a head of 7.5 m, develops 1750 kW with an overall efficiency of 85 %. The turbine is set 2.50 m above the tail water level and vacuum gauge inserted at turbine outlet records a suction head of 3.15 m. Calculate the efficiency of the draft tube, if it has an inlet diameter of 3.50 m and loss of head due to friction in the draft tube equals 25 % of kinetic head at outlet. (06)
-
- Q6 (a) Explain in brief: Head-Discharge curve of a centrifugal pump. (06)
- (b) What is multistage pump? How it works? Explain. (06)
- (c) A centrifugal pump lifts water under a static lift of 45 meter of which 5 meter is suction lift. The suction and delivery pipes both are 20 cm in diameter. The friction loss in suction pipe is 3 meter and in delivery pipe it is 5 meter. The impeller is 50 cm in diameter and 30 mm wide at outlet and runs at 1000 rpm. The exit blade angle is 22 degrees. If the manometric efficiency of the pump is 85 %, Determine: (08)
- (i) Discharge from a pump; and
- (ii) Pressure at the suction and delivery ends of the pump.
-
- Q7 (a) Explain with a neat sketch working of: (i) Hydraulic Ram; and (ii) Hydraulic press. (08)
- (b) Derive Hagen-Poiseuille equation for laminar flow in the circular pipes. (06)
- (c) Explain the Hardy-Cross method of pipe network analysis. (06)



T.Y.B.Tech. Sem V
Geotechnical Engineering - I
BHARATIYA VIDYA BHAVAN'S

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18/11/2015

SARDAR PATEL COLLEGE OF ENGINEERING

Munshi Nagar, Andheri (West), Mumbai 400 058

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END SEMESTER

Nov-Dec 2015



Max. Marks: 100

Duration: 3 hours

Class: T.Y. B. Tech.

Semester: V

Course: CE 302- Geotechnical Engineering - I

Program: Civil Engineering

Note:

Master file .

- Question 1 is compulsory.
- Attempt **any four** out of remaining **six** questions.
- Assume suitable data if required and state it clearly. State units at all possible places.
- Figures to right indicate full marks. CO_n corresponds to nth course outcome being attained.

- a) Distinguish between compaction and consolidation of soil. CO3 (05)
 - b) For a field pumping out test, a well was drilled through a 14.5 m thick sand layer, underlain by clay. Two observation wells were drilled at a distance of 16 m and 34 m respectively, from the center of the pumping well. The initial ground water table was observed at 2.0 m below ground level. For a steady pumping rate of 900 litres/min, the drawdown in the observation wells was noted as 2.5 m and 1.5 m respectively. Calculate the coefficient of permeability of the sand layer. CO2 (05)
 - c) The pavement of a road on a level ground is to be laid on a base course 400 mm thick, consisting of cohesionless soil with good drainage properties. The void ratio of this soil is 66.7% and degree of saturation is 80%. If there is sudden rainfall during construction work and all the water infiltrates into the ground immediately, calculate the rainfall in mm that would saturate the base course to its full thickness. Assume 1.0 m² area in plan. CO1 (05)
 - d) State the advantages and disadvantages of a triaxial strength test for soil. CO3 (05)
- a) Historic topographical maps for two sites – Site A and Site B were obtained from Survey of India and are shown in Figure 1. Figure 2 shows the existing topography at sites A and B. Both sites have soil classified as clay up to a depth of 15 m below existing ground level. Recommend which site is preferable for construction of a G+1 RCC structure from a geotechnical perspective, and state your reasons for the same. CO3 (05)
 - b) A CD test was conducted on a saturated specimen of cohesionless sand and it failed at a deviator stress of 350 kPa. The failure plane made an angle of 61° with the horizontal. Calculate the principal stresses analytically. If another sample of the same soil is tested at a cell pressure of 250 kPa, determine analytically the deviator stress at failure. CO2 (05)
 - c) Illustrate and explain the method of slices to determine the stability of slopes. Also explain how Fellenius simplified the process of determining the most CO3 (10)

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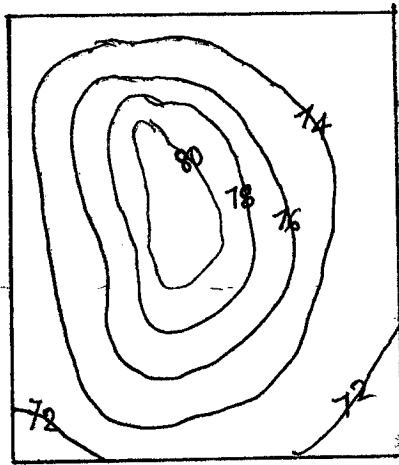
3. a) State the assumptions made in Terzaghi's one dimensional consolidation theory. Also comment their validity. CO1 (05)
 b) In a direct shear test (box size 6cm x 6cm) on a sand sample, the following observations were made. Determine the shear parameters graphically. CO2 (05)

Sample No.	Normal Load (kN)	Shear Load (kN)
1	45	30
2	84.6	57.6
3	124.12	85.32

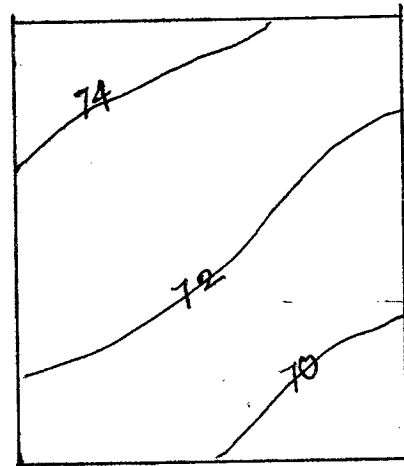
- c) Two soils A and B have the following properties. Determine which soil is a better foundation material when remoulded. State your reasons. Could organic material be present in this soil? Justify your answer. Plot the soils on Casagrande's plasticity chart (A-line chart) CO2 (10)
 Soil A - LL = 18%, PL = 38%, NMC = 40%, Flow index = 10
 Soil B - LL = 20%, PL = 60%, NMC = 50%, Flow index = 5
4. a) Two sheet piles of length 6.0 m are embedded into fine sandy soil. A trench is excavated between these sheet piles up to a depth of 4.0 m below ground level and water is pumped out of the excavation. Water level exists at a depth of 1.0 m below ground surface outside the excavation. Examine whether the bottom of the trench is subjected to quick condition if $G=2.65$ and void ratio is 0.8. If so, suggest at least two alternative remedial measures that can be taken. CO3 (10)
 b) From the first principles, derive the relationship between major and minor principal stresses in soil. CO1 (10)
5. a) A wet soil sample weighing 2345g has a volume of 1150 cc. If the specific gravity is 2.65 and weight of soil after oven drying is 1998g, calculate moisture content, bulk density, dry density, porosity. CO2 (05)
 b) Explain with sketches the spring analogy for consolidation of soil CO1 (05)
 c) List the important information obtained for a site as a part of a geotechnical investigation programme and how it is used for design or construction. Illustrate with the sketch of a borelog. CO4 (10)
6. a) If soil sample A is SP and soil sample B is CL as per IS1498, describe the soil. CO2 (05)
 b) A 20 mm thick sample of clay requires 5 hours for 75% consolidation under double drainage conditions. How long will it take for a 6m thick clay layer under single drainage, to reach 75% consolidation? CO3 (05)
 c) What is sensitivity of clays? Explain how it is important in understanding and predicting the behavior of clays. CO1 (05)
 d) Briefly explain undisturbed, disturbed and remoulded sample of soil. CO4 (05)
7. a) Explain how moisture content and type of soil affect the compaction of soil in the laboratory and field. Illustrate with graphs. CO2 (05)
 b) Calculate the coefficient of volume compressibility of a clay if a 4 m thick clay layer undergoes a total consolidation settlement of 50 mm under an effective stress increase of 10kPa. CO3 (05)
 c) Derive Laplace's equation for flow of fluid through soil. CO1 (10)

(2)

T.Y.B.Tech. Sem V
Geo technical Engg - I Date: 18/11/15
Q.2. a) FIGURE 1 (HISTORIC TOPO)

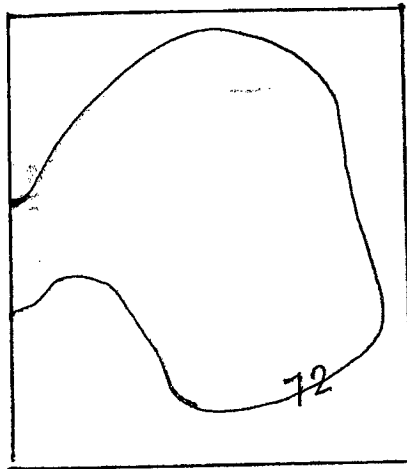


SITE A

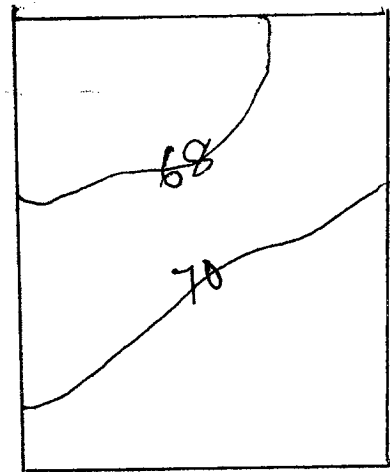


SITE B

FIGURE 2 (EXISTING TOPO)



SITE A



SITE B

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16-11-15

T. Y. B. Tech. Sem V
Structural Analysis - II
Bharatiya Vidya Bhavan's
SARDAR PATEL COLLEGE OF ENGINEERING
(A Government Aided Autonomous Institute)
Munshi Nagar, Andheri(West), Mumbai 400 058



End Semester Exam
November 2015

Max. Marks : 100
Class: TY B.Tech
Name of the Course: Structural Analysis - II

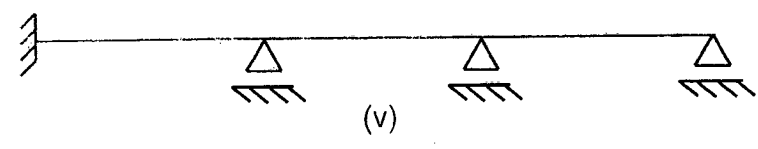
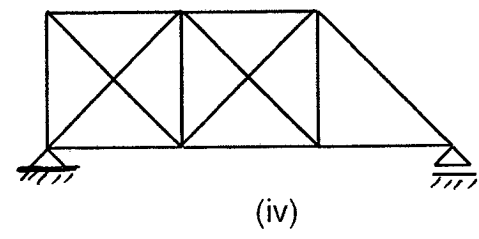
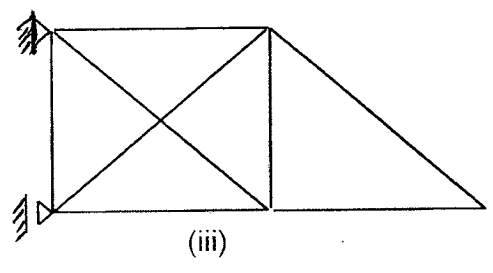
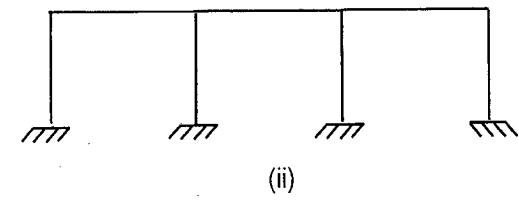
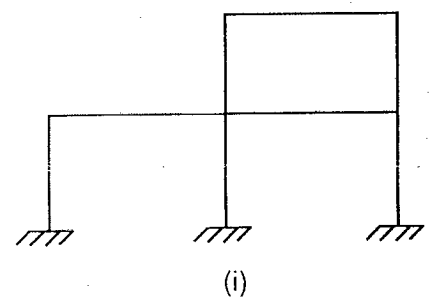
Semester: V

Duration : 3 Hours
Program: BTech in Civil Engineering
Course Code : **CE 301**

- Attempt any FIVE questions out of SEVEN questions.
- **Answers to all sub questions should be grouped together.**
- Figures to the right indicate full marks.
- Assume suitable data if necessary and state the same clearly.

Master file.

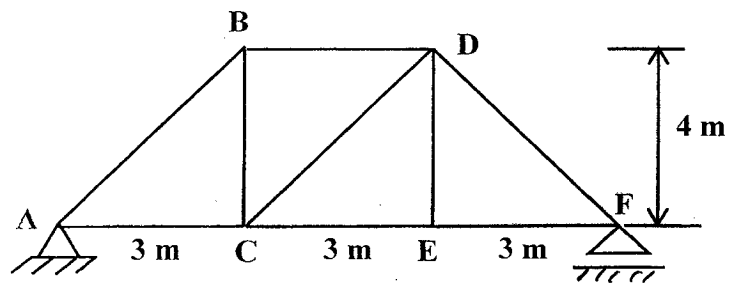
Q.1 (a) **Determine the static and kinematic indeterminacy of the structures shown** (10)
in figures below.



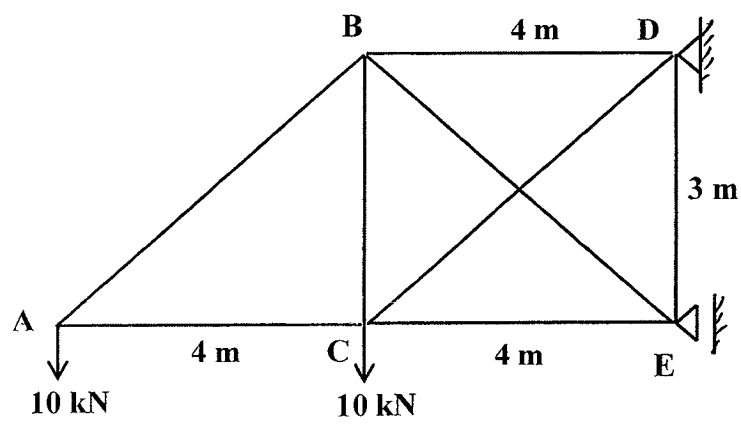
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T. Y. B. Tech. Sem V
 Structural Analysis - II Date - 16/11/15

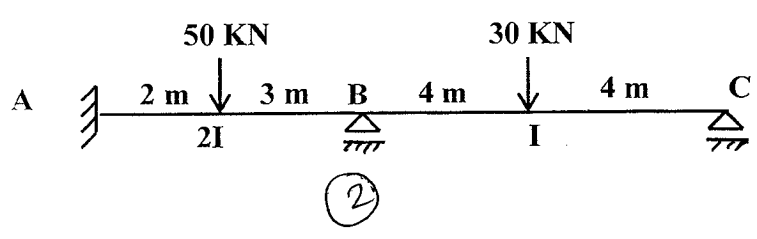
Q.1 (b) The members of the truss shown in figure are subjected to temperature increase of 30°C . Calculate the vertical deflection of C due to the increase in temperature. Take $\alpha = 12 \times 10^{-6}/^{\circ}\text{C}$. (10)



Q.2 (a) Find the force in the redundant member BE of the truss loaded as shown in figure below. (Take force in member BE as the redundant force.) Assume AE to be same for all the members. (10)



Q.2 (b) Analyse the continuous beam shown in figure using three moment theorem. (10)

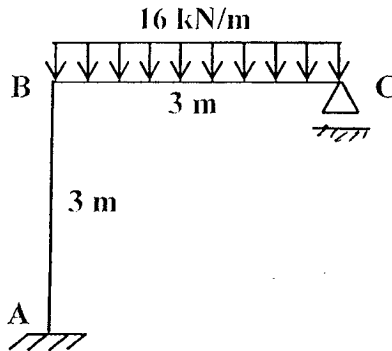


(2)

T.Y.B.Tech. Sem V,

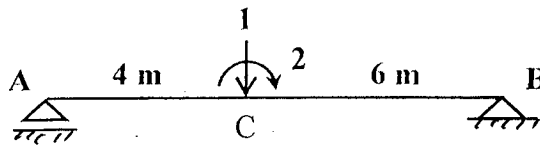
Structural Analysis - II Date - 16/11/15.

- Q.3 (a) Find the reaction at C in the frame shown in figure using the theorem of least work. (10)

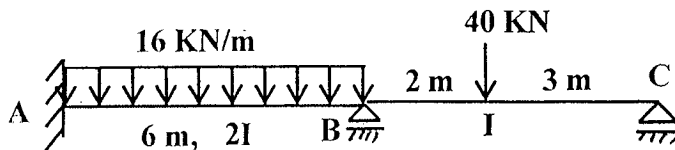


- Q.3 (b) A two hinged parabolic arch of span 30 m and rise 5 m carries a concentrated load of 60 kN at a distance of 7 m from the left support. Determine the horizontal thrust in the arch. The moment of inertia (MI) of the section of the arch varies as $I = I_0 \sec\theta$, where $I_0 = MI$ of the section at the crown. (10)

- Q.4 (a) Calculate the flexibility coefficients for the beam shown in figure w.r. to the coordinates indicated in figure. (10)



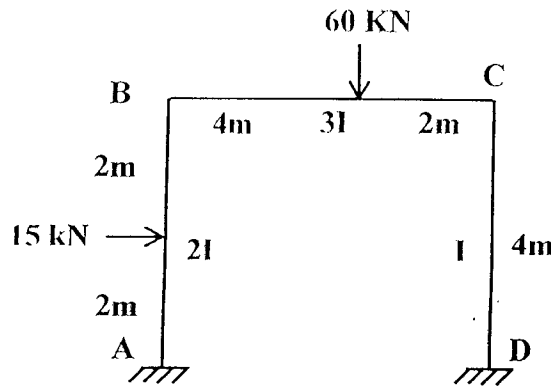
- Q.4 (b) Analyse the beam shown in figure by slope deflection method. Support B settles down by 15 mm. $E = 200 \times 10^6 \text{ kN/m}^2$, $I = 80 \times 10^6 \text{ mm}^4$. (10)



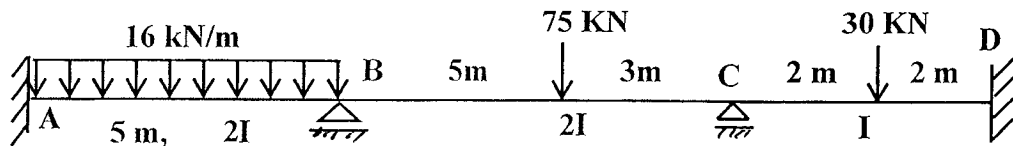
(3)

(3)

Q.5 Analyse the frame shown in figure by moment distribution method. Draw BMD. (20)



Q.6 (a) Analyse the beam shown in figure by stiffness method. (12)



Q.6 (b) (i) Name any two methods of (a) Force method (b) Displacement method. (04)

(ii) Define stiffness coefficient K_{ij} and state the important properties of the stiffness matrix (04)

Q.7 (a) Find the shape factor for the unsymmetrical I section with the following data. (10)

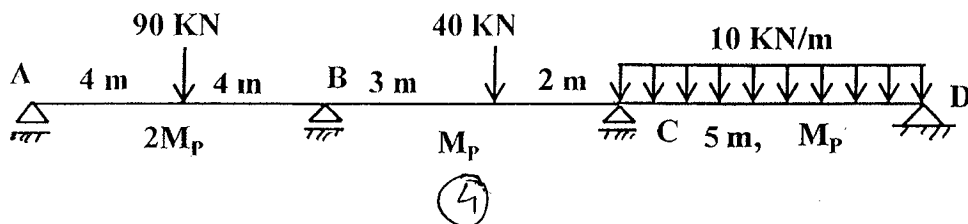
Top flange - width = 400 mm, thickness = 25 mm

Bottom flange - width = 300 mm, thickness = 20 mm

Depth of web = 300 mm, thickness of web = 20 mm.

Q.7 (b) A continuous beam is subjected to working loads as shown in figure below. (10)

If $M_p = 80$ kN-m, calculate the (true) load factor for the beam.





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KT Exam
Nov - Dec 2015

Max. Marks: 100

Class: T.Y.B.Tech

Name of the Course: Environmental Engineering I

Course Code: CE 355 T.Y.B.Tech. (Civil) sem VI -
Environmental Engineering - I

Duration: 3 Hrs

Semester: VI

Program: B. Tech Civil

Total Marks: 100

Duration: 3 Hours

- Question No. 1 is compulsory
- Attempt any four more questions from the remaining six
- Make suitable assumptions if necessary and state them clearly.
- Draw neat sketches where necessary and show all supporting calculations

Master file.

Q1) Answer the following questions:

(10)

a) Fill in the blanks

1. Ecosystem consist of _____ and _____.
2. The per capita per day demand of water is an average value over a period of _____.
3. The total water consumption including domestic, commercial and industrial and public use for an Indian town with full flushing system as per IS code is taken as _____.
4. _____ process is used to clean rapid sand filter
5. _____ is a naturally occurring ion exchange.
6. pH of acidic water is _____.
7. Aeration of water removes _____.
8. _____ can remove 100% pathogens in water treatment process flowsheet.

b) Answer in short any five

(10)

- a) Define (i) Ecology (ii) Ecosystem
- b) What is the difference between heterotrophs and autotrophs? Give two examples of each
- c) What is air pollution? Classify air pollutants
- d) Explain the classification of hazardous wastes.
- e) State and explain Leibig's law of minimum
- f) What are the functional units of integrated solid waste management.

(1)

Q2) (a) What is the major objective of any water supply scheme? Draw the flowsheet of conventional surface water treatment plant in detail. Explain in detail the function of each unit with degrees of removal of turbidity. (10)

(b) Write a note on characteristics (physical, chemical and biological) affecting the quality of water. (10)

Q3) (a) Enumerate forecasting methods. Forecast the population for 2060 using incremental increase and geometric increase method using data depicted in following table (10)

Census	Population
1960-70	3,03,600
1970-80	3,20,000
1980-90	3,50,000
1990-2000	4,10,000
2000-2010	4,60,000

(b) Design a paddle flocculator for 20 MLD plant with following details: (10)

Detention time = 15 min
Average $G = 40 \text{ s}^{-1}$
Speed of paddles = 6 rpm
 $K = 0.25$
 $\mu = 1.0087 \times 10^{-3}$
 $\rho = 998 \text{ kg/m}^3$ at 20°C
Ratio of L:B = 2.0

Q4) (a) Explain the concept of ideal settling tank and derive the equation for surface loading rate. (10)

(b) Two settling basins are 30 m in diameter with 2.5 m water depth. Single effluent weirs are located on periphery of the tanks, for a flow of $30,000 \text{ m}^3/\text{d}$ calculate: (i) surface area (ii) Overflow rate (iii) Detention time (iv) Weir loading rate.

Q5) (a) Design a rapid sand filter for 5 MLD of water per day. Assume suitable data. (10)

(b) Explain the basic graph of chlorination with definitions and concept of breakpoint chlorination, residual chlorine, dose of chlorine and free chlorine. (10)

Q6) (a) An ecologist harvests 5 plots of 0.3 m^2 each at the end of the growing season to determine NPP and GPP of a grassland, The dry masses for each plot: Plot 1 = 102 grams, Plot 2 = 106 grams, Plot 3 = 143 grams, Plot 4 = 170 grams, Plot 5 = 105 grams, Plot 6 = 104 grams. A growing season ends every 6 months. (4)

(b) Write short notes on any four (16)
(i) Filter troubles (ii) Removal of Iron and manganese (iii) removal of color and odor
(iv) Water softening

Q7) (a) Write short notes on any two (10)

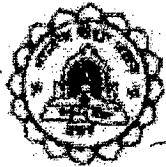
(i) Composting (ii) ecological pyramids (iii) Factors affecting generation of solid waste

(b) Write short notes on any two (10)

(i) Fluoridation and defluoridation (ii) Differences between slow and rapid sand filter
(iii) Incineration

2

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07-01-16 Re. Exam



**Bharatiya Vidya Bhavan's
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MUNSHI NAGAR, ANDHERI (WEST), MUMBAI-400 058.**



T. Y. B. Tech. (Civil) Sem VI
Transportation Engineering - II

Nov. 2015

End Semester Examination

T. Y. B. Tech. Civil (Sem - VI)

Course Name - Transportation Engineering - II(CE-354)

Marks: 100

Duration: 3 Hr.

Note:

Master file.

- (i) assume suitable data if required
- (ii) Question one is compulsory, solve any four Questions out of remaining six

Q.1. write short notes on (Solve any Four) (20)

- (a) Different Methods of Subgrade Stabilization
- (b) Piers and Abutments.
- (d) Afflux and its consequences in Bridge construction.
- (e) Different type of joints of cement concrete pavement.
- (f) Steps for construction of WBM road.

Q.2.

- (a) As an highway engineer you are required to locate the alignment of new highway. What are the different stages of engineering survey you would like to carry out while finalizing the alignment. (10)
- (b) Discuss various factors you will consider while selecting the site for bridge. (10)

Q.3.

- (a) Derive an expression for finding the extra widening required on horizontal curve. Also, explain how widening of pavement introduced in field. (07)
- (b) Calculate the extra widening of pavement required on horizontal curve of radius 700 m on two lane highway. Assume design speed = 80 km/hr, wheel base = 6 m. (06)
- (c) List the different test to be conducted on Road Aggregate. Discuss any one of them with recommendation and specification. (07)

Q.4.

- (a) Derive the formula used for economic span of bridge stating assumption made. (07)
- (b) Following are the costs involved in a uniform multiple span bridge construction. Calculate economic span,

Span	5	9	13	16
Cost of girder (Rs.)	1600	6000	5000	24000
Cost of single piers and its foundation	14000	19000	1000	32000

- (c) Explain with neat sketches the method of eliminating camber and introduction of superelevation on curve portion of road. (06)

1

Q.5.

(a) The existing flexible pavement was tested using Benkelman Beam with a test vehicle of ESWL 4085 and tyre pressure of 5.6 kg/cm^2 . The observations recorded at a pavement temperature of 40°C are given below. 1.46, 1.52, 1.56, 1.76, 1.96, 1.74, 1.68, 1.74, 1.96, 1.42, 1.56, 1.62, 1.68, 1.90, 1.89. Calculate the thickness of bituminous concrete overlay to be provided over the existing pavement. Assume following data, (i) allowable deflection = 1.25 mm, (ii) subgrade moisture content = 1.2, (iii) Use IRC approach for overlay design. (10)

(b) The speed of overtaking and overtaken vehicles are 60 km/hr and 30 km/hr respectively on two way traffic road. If the acceleration of overtaking vehicle is 0.99 m/sec^2 . (10)

- Calculate the safe overtaking sight distance.
- Find the minimum length of overtaking zone.
- Draw a neat sketch.

Q.6

- Write short notes on application of geotextile and geogrid in highway pavements. (06)
- Discuss Importance of highway drainage. (06)
- The speed range and corresponding number of vehicles are given draw the frequency curve and determine Upper speed limits, Lower speed limits and speed for Geometric Design. (08)

Speed range (kmph)	Number of vehicles
0-10	12
10-20	18
20-30	68
30-40	89
40-50	209
50-60	255
60-70	119
70-80	43
80-90	33
90-100	09

Q.7. Write short notes on any four (20)

- Rotary island
- Bridge bearing
- Difference between Bitumen and Tar
- Function of Piers and Abutment
- Stopping Sight Distance

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THEORY OF REINFORCED AND PRESTRESSED CONCRETE

Duration : 3 Hours

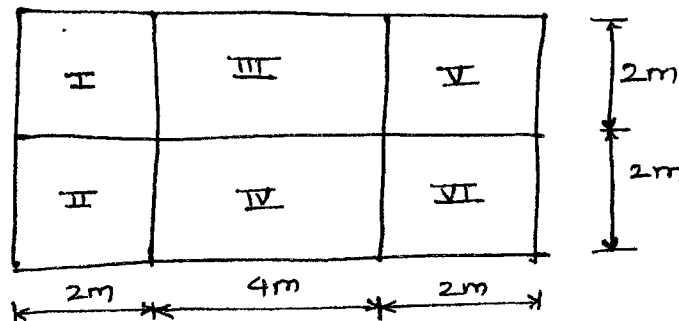
(100 MARKS)

T.E. (Civil) SEM VI

- Attempt any FIVE questions out of remaining SEVEN questions.
- Assume any other data needed suitably if not given; but justify the same.
- Illustrate your answers with neat sketches wherever required, though not sought specifically.
- Use of IS 456:2000 is allowed.

Master file.

- Q.1.a Calculate the moment of resistance of an RC beam 250 x 550 mm overall. Reinforcement is 1521 mm² and is placed at a distance of 25 mm from the bottom, $\sigma_{cbc} = 7 \text{ N/mm}^2$, $\sigma_{st} = 140 \text{ N/mm}^2$, $m = 13.33$. 10
- b. A doubly reinforced concrete beam 250mm wide and 600 mm deep overall has to resist an external bending moment of 95 Kn-m. Find the amount of tensile and compressive steel required, if cover to the center of the steel on both sides is 50mm, $\sigma_{cbc} = 5 \text{ N/mm}^2$, $\sigma_{st} = 140 \text{ N/mm}^2$, $m = 18.66$. 10
- Q.2.a. A beam 300 x 1010 mm effective has a span of 7m. Total load on the beam is 45 Kn -m. Tensile reinforcement is by 6-22 mm Φ bars. If concrete is M 20 and Fe 415 , design grade r/f. 10
- b. A short column 300 x 400 mm has to carry a load of 1000 kN. Find the area of steel if $\sigma_{cc} = 5 \text{ N/mm}^2$ and $\sigma_{sc} = 130 \text{ N/mm}^2$. Provide suitable bars of longitudinal steel and design the links. 8
- c. Explain Shear Reinforcement. 2
- Q.3. Figure below shows a line plan of a public building. Design the floor slab with the following data. Live load = 5 Kn/m², floor finish = 0.5 kN/m², partitions = 1.0 Kn/m² concrete M20 and Fe 500 (Design panel III and VI) 20



- Q4.a. A prestressed concrete beam of a rectangular section 300 mm wide and 600 mm deep has a span of 10 m. The effective prestressing force is 980 kN at an eccentricity of 120 mm. The dead load of the beam is 4.5 Kn/m and the beam has to carry a live load of 75 kN/m. Determine the extreme stresses. 15
- (i) At the end section
(ii) at the mid section without the action of live load.
(iii) at the mid section with the action of live load. (1)

Theory of Reinforced & prestressed concrete.

- b. Explain general principle of Prestressing. 5
- Q.5.a. Design one way simply supported slab given the following data. Span = 4m; superimposed load = 2 Kn/m^2 , floor finish = 1 kN/m^2 ; concrete M15 and mild steel. Support = 345 mm wide wall. 10
- b. A prestressed concrete beam with a rectangular section 120 mm wide by 300 mm deep supports a uniformly distributed load of 4 Kn/m , which includes the self-weight of the beam. The effective span of the beam is 6 m. the beam is concentrically prestressed by a cable carrying force of 180 kN. Locate the position of the pressure line in the beam. 10
- Q.6.a. A prestressed beam 200 mm wide & 300 mm deep, is prestressed by 10 wires of 7mm diameter initially stressed to 1200 N/mm^2 , with their centroids located 100 mm from the soffit. Find the max stress in corner immediately after transfer, allowing only for elastic shortening of concrete. If the concrete undergoes a further shortening due to creep & shrinkage while there is a relaxation of 5% of steel stress, estimate the final percent loss of stress in the wire using IS 1343-1980 15
- $E_s = 210 \text{ Kn/mm}^2$, $E_c = 5700 (\text{fcu})^{0.5}$, $\text{fcu} = 42 \text{ N/mm}^2$, $\Phi = 1.6$
Total residual shrinkage strain = 3×10^{-4}
- b. Explain Balanced, Under-reinforced and Over-reinforced sections. 5
- Q.7.a. Find the neutral axis of a T beam of effective depth 400 mm and flange width 1200 mm. Assume slab thickness to be 100 mm. Tensile steel consists of four 18 mm Φ bars, $b_w = 200 \text{ mm}$ and $m = 13.33$ 12
- b. Explain Working Stress method of design. 4
- c. Explain thrust line and pressure line. 4

* * * * *

T.Y.B.Tech (Civil) Sem VI
Hydraulic Engineering - II Dt-04/01/16



BHARATIYA VIDYA BHAVAN'S



SARDAR PATEL COLLEGE OF ENGINEERING
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ANDHERI (WEST), MUMBAI - 400 058.

Re-Examination

January 2016

Max. Marks: 100

Duration: 3 hours

Class: T.Y. B.Tech. (Civil)

Semester: VI

Name of the Course: Hydraulic Engineering-II

Program: Civil Engineering (UG)

Course Code: CE353

Master file.

Instructions:

- Solve *any five questions* out of seven.
- Answer to all sub questions should be grouped together.
- **Figure** to right indicates full marks.
- Assume suitable data wherever necessary and state it **clearly**.

Question No.		Max. Marks
Q1 (a)	Differentiate between hydrodynamically smooth and rough boundaries also explain with neat sketches velocity distribution in (i) smooth pipes (ii) rough pipes.	(10)
(b)	Explain with neat sketch the concept of Prandtl's mixing length and flow establishment in a circular pipe.	(10)
Q2 (a)	What do you mean by separation of boundary layer? What is effect of pressure gradient on boundary layer separation?	(10)
(b)	For a velocity distribution $(u/U) = 2.(Y/\delta) - (Y/\delta)^2$ Determine displacement thickness, boundary layer thickness, momentum thickness and energy thickness.	(10)
Q3 (a)	Write short note on: (<i>any two</i>) (i) Circulation (ii) Magnus effect (iii) Streamlined and bluff bodies.	(10)
(b)	A kite of size 0.50 m x 0.50 meter weighing 7.50 N assumes an angle of 15° to the horizontal. The string attached to the kite makes an angle of 45° to the horizontal and at this position the coefficient of drag and lift are 0.60 and 0.75 respectively. Find speed of the wind and the tension in the string. Take Density of air = 1.25 kg/m ³ .	(10)

①

T.Y.B.Tech. (Civil) sem VI
Hydraulic Engineering - II Dt. 04/01/16.

- Q4 (a) Derive the condition for most economical trapezoidal channel section to carry maximum discharge. (10)
- (b) A rectangular channel conveys a discharge of 20 m³/sec. If the width of the channel is 5 meters, find the depth of flow. Take Chezy's Constant (C) = 60, and bed slope 1/5750. Determine necessary bed slope for depth of flow of 1.25 meters using Manning's coefficient (N). Establish relationship between Chezy's coefficient (C) and Manning's coefficient (N). (10)
- Q5 (a) Explain with neat sketches: Specific energy and specific force curve. Also state its significance in the channel flow analysis. (10)
- (b) Derive an expression for discharge (Q) through venturiflume. (10)
- Q6 (a) Derive the dynamic equation for GVF for a wide rectangular channel. Also explain the flow profiles in steep sloped channel. (10)
- (b) A wide rectangular channel of width 1.50 meter carries a discharge of 2 cum/sec at a depth of 0.20 meter. Calculate;
(i) The specific energy
(ii) alternate depth
(iii) Froude numbers at alternate depth. (10)
- Q7 (a) What do you mean by hydraulic model testing? Explain in brief. Also explain distorted models and scale effects in hydraulic model testing. (10)
- (b) The head loss due to friction ' h_f ' in a pipe flow depends upon diameter of pipe ' D ', friction factor ' f ', length of pipe ' L ' and rate of flow through pipe ' Q ', gravitational constant ' g '. Obtain an expression for head loss using Buckingham's- π method. (10)



Sardar Patel College of Engineering

(A Government Aided Autonomous Institute)

Munshi Nagar, Andheri (West), Mumbai - 400058.

Re - Exam of Even Semester

January 2015



Max. Marks: 100

Class: T. Y. B. Tech

Name of the Course: Design and Drawing of Steel Structures

Course Code :

Duration: 4-hours

Program: Civil Engg

Semester: VI

Instructions:

1. Question No 1 is compulsory.
2. Attempt any four questions out of remaining six.
3. Draw neat diagrams
4. Assume suitable data if necessary

Master file.

Question No		Maximum Marks
Q1 Any Four	<ol style="list-style-type: none">1. Specify classifications of structural connection. Explain with sketches & graph2. List all the parameters affecting the lateral stability of flexural member3. Explain the complete procedure for wind load calculation4. Under what circumstances built up laced or battened columns are selected. Which system is stronger & why?5. List all the geometrical properties of steel sections & explain the signification of some of its important properties	20
Q2(a)	Find tension capacity of $2\angle 90 \times 90 \times 12$ if connected on same side of gusset plate & tack bolted. Also design the end connection. Yield & ultimate strengths are 250 & 410 MPa & use M24 bolt having class 4.6. Draw a neat sketch	12
(b)	Design the seat angle connection between the beam ISMB250 and column ISHB200 for a factored reaction from beam equal to 85kN. Use M16 bolts of 4.6 grade and steel 410 with $f_y = 250$ MPa	8
Q3(a)	Find the compressive strength of a discontinuous strut 2.5 m long. Take $2\angle 75 \times 75 \times 8$ Yield strength is 250 MPa <ol style="list-style-type: none">1. Connected on same side by more than one bolt2. Connected on both side of 8 mm thick plate by two bolts	12
(b)	A beam ISMB450 transfers a factored load of 260kN to a column ISHB250. Using Fe410 grade steel design the stiffened seat connection with bolting	8
Q4	Design Laced column with channels back to back to carry compressive load of 900kN & unsupported length of 9 m. Both ends are pinned. Assume bolted connection.	20
Q5(a)	Design a suitable I beam for a simply supported span of 5 m. and carrying a dead load of 20 kN/m and imposed load of 40 kN/m Take $f_y = 250$ MPa. Assuming the beam as restrained laterally but having stiff bearing	12

(b)	A beam ISMB400 transfers a factored load of 150kN to a beam ISMB450. Using Fe410 grade steel design the web cleat connection with bolting	8
Q6	Design a Gusseted base for a column ISMB250 having working load of 1100kN, yield strength 250 MPA & use M25 grade of concrete	20
Q7(a)	Design a laterally unsupported beam of span 7 m & subjected to uniformly distributed load of 30kN/m	12
(b)	Design the welded cleat angle connection between the beam ISMB250 and column ISHB200 for a factored reaction from beam equal to 80kN.	8

Note: Use Font as Times New Roman, Font size 12 with single spacing.