UNIVERSITY OF PUNE

[4363]-2

T. E. (Civil) May 2013 Examination

Structural Design I

(2003 Course)

Total No. of Questions : 8 **[Total No. of Printed Pages :4]**

[Time : 4 Hours] **[Max. Marks : 100]**

Instructions :

(1) Answer Q.1or Q.2, Q.3 or Q.4 from section I, Q.5 or Q.6 and Q.7 or Q.8 from section II.

*(2) Answers to the **two sections** should be written in **separate answer-books**.*

(3) Neat diagram must be drawn wherever necessary.

(4) Figures to the right indicate full marks.

(5) Use electronic pocket calculator, IS 800 and Steel Tables is allowed.

(6) Assume suitable data, if necessary.

(7) Take yield stress of the material as 250 Mpa.

SECTION-I

Q1.

a) Define gauge line, pitch and edge distance with suitable sketches. [5]

b) Design a tension member consists of two equal angles connected to either side of gusset plate with bolts carries an axial load of 200 kN. [10]

c) A bracket plate 10 mm thick is used to transmit a reaction of 100 kN at a distance of 125 mm from column flange as shown in **Fig.1 c.** Design the welded connection and draw design details. [10]

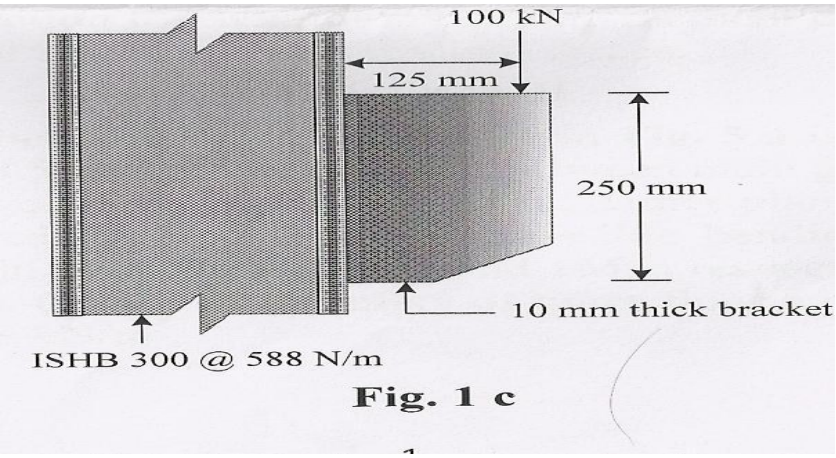

Fig. 1 c

OR

Q2.

a) State the difference between bolted and welded connections. [5]
b) Design a single unequal angle strut to carry a load of 90 kN. The angle is connected by its longer leg to 8 mm thick gusset plate. The effective length of the member is 2.5 m. Also design the plate bolted end connections. [10]
c) An ISLB 325 @ 43.1 kg/m transmit an end reaction of 125 kN to the web of ISHB 300 @ 63 kg/m. design the bolted connection and draw the design details. [10]

Q3.

a) Design a simply supported beam of 5 m effective span, carrying a uniform distributed load of 35 kN/m including its self weight. The compression flange of the beam is laterally supported throughout the span. [9]
b) Design suitable cross section of welded plate girder of span 28 m carrying a uniformly distributed load 100 kN/m. Also design connection between flange and web, vertical stiffeners and draw design details. [16]

OR

Q4. Design a simply supported gantry girder to for the following data [25]

Crane capacity	: 160 KN
Self weight of crane girder	: 200 KN
Self weight trolley, electric motor, hooks etc.	: 50KN
Min. approach of crane hook to the gantry girder	: 1.6 m

Wheel base	: 2.8 m
c/c distance between gantry rail	: 12 m
c/c distance between column	: 6m
Self weight of rail section	: 300 N/m

Check the section for maximum bending moment due to vertical forces, lateral forces and longitudinal forces.

SECTION-II

Q5.

a) An N-type foot over bridge as shown in **Fig. 5 a** is subjected to live load of 3.5 kN/m^2. Clear width between main girders is 3 m, spacing between cross girders 2.75 m. Timer planks of 80 mm thick provided for flooring. If permissible bending stress and shear stress in planks are 8 Mpa and 1 Mpa respectively, design cross girders. Comment on safety of timer flooring. Unit weight of timber is 8 kN/m^3. [12]

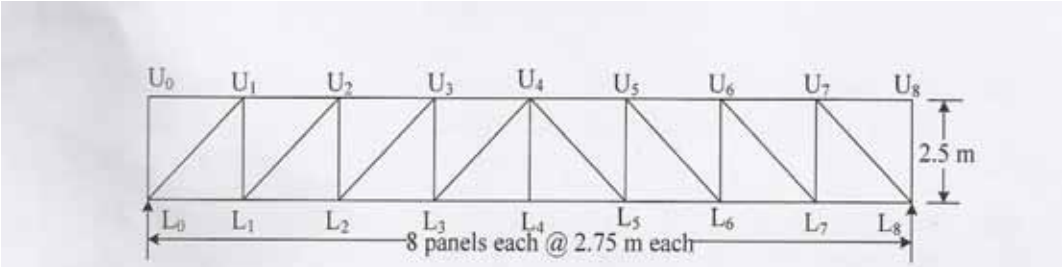

Fig. 5 a

b) Determine the panel point Dead load, live load and wind load for truss as shown in **Fig. 5 b**. Spacing of trusses in 5m c/c and wind velocity 39 m/s. Assume k_1=1.0, k_2=0.98, k_3=1.0. C_{pe}= -0.7 and C_{pi} = ± 0.5. Self weight of roof covering is 110 N/m^2. [13]

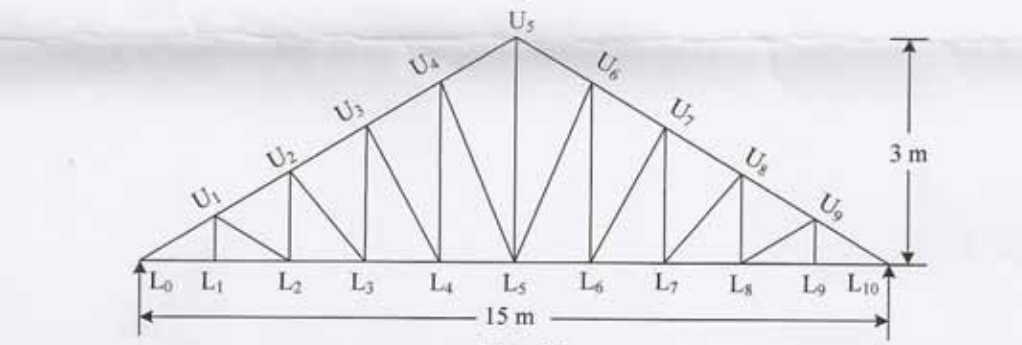

Fig. 5 b

OR

OR

Q6.

a) For the foot over bridge shown in **Fig.5 a,** design the members U_4U_5, L_4L_5 and U_4L_5. RCC slab of 120 mm thick is provided as flooring. Clear width is 2.8 and live load is 4 KN/m^2. [12]

b) For the truss shown in **Fig. 5 b,** panel point dead load, live load and wind load are as follows. Design members U_4U_5, L_4L_5 and U_4L_5. [13]

S.N	Type of load	Intermediate panel point load in kN
01	Dead load	03
02	Live load	02
03	Wind load	05 (suction)

Q7.

a) A column 9 m effective length carries an axial load 1000 KN. Design a column section using two channels placed back to back at a suitable spacing. Design battens systems. Also design the suitable slab base for the column. Assume the permissible compressive stress in concrete 4Mpa. Draw the design sketches. [25]

OR

Q8.

a) State the merits and demerits of cold from light gauge steel section. Also enlist and draw the different sections used in cold from steel. [10]

b) Design a suitable moment resisting base for a column subjected to an axial load of 360 kN and moment of 130 kNm. The column section is ISHB 400 @ 822 N/m. safe bearing pressure in concrete is 4000 kN/m^2. [15]

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[4363]-1

T E (civil) Examination - 2013

GEOTECHNICAL ENGINEERING

(2003 Course)

Total No. Of Questions: 12 **[Total No. Of Printed Pages: 4]**

[Time: 3 Hours] **[Max. Marks: 100]**

Instructions:

*(1) Answer **three questions** from each section1 and three question from section 2.*

*(2) Answers to the **two sections** should be written in **separate answer-books**.*

(4) Neat diagrams must be drawn wherever necessary.

(5) Use of logarithmic tables, slide rule, electronic pocket calculator is allowed.

(6) Assume suitable data, if necessary.

SECTION-1

Q. 1. A) Clearly explain the use of knowledge of geotechnical in construction (6)

Of 1) Embankment for road or railway 2) earth retaining wall

B) Define water content and explain determination of it by oven drying (6)

Method

C) Explain soil a three phase system (6)

OR

Q. 2. A) state the different methods to determine field density of soil. Explain (6)

Any one of them.

B) The density of soil sample is 20kN/ m^3 And its water content is (8)

18%, determine its dry density, void ratio, porosity, and degree of saturation. Assume G=2.7

C) Define the following terms and write formulae for the same (4)

1) water content 2)voids ratio

Q.3. A) state and explain the factors affecting permeability of soil (6)

B) Determine the coefficient of permeability of soil from the following data (6)

length of soil sample=23cm Area of c/s of the sample = 30 cm^2

Head of water = 40 cm Discharge = 200 ml in 110sec

C) What is quick sand condition and derive the relation of critical Height. (4)

OR

Q. 4. A) state Dracy's law, Discuss the validity of Darcy's law for flow of Water through soils. (6)

B) In a falling head permeability test on a silty clay sample, the following Results were obtained: sample length 120 mm, sample diameter 80 mm. Final head 400 mm, time for fall in head 6 minutes, stand pipe diameter Is 4 mm. find the coefficient of permeability of soil in cm/sec. (6)

C) What are the properties of flow net (4)

Q. 5. A) State and explain any factors which influence compaction of soil. (6)

B) In a standard proctor test the following observations recorded. (6)

Sample no	1	2	3	4	5	6
Water Content%	11.3	12.2	13.0	14.2	15.1	16.4
Bulk Density(kN/m^3	19.78	20.83	21.47	22.08	21.88	21.47

Plot compaction curve and determine the OMC and MDD

C) Differentiate between light weight compaction test and heavy (4)
Compaction test.

OR

Q. 6. A) What is 'equivalent point load method' to find vertical stress in soil? (4)

B) Distinguish between Boussinesq's theory and westergaard theory of (6)
Stress distribution.

C) What is pressure bulb? Explain its use. (6)

SECTION-2

Q. 7.A) State the factors affecting shear strength of soil and explain the terms (6)
Sensitivity and thixotropy.

B) Explain unconfined compression test procedure with neat sketches. (6)

C) What are the advantage and disadvantage of triaxial compression (6)
Test in comparison with the direct shear test?

OR

Q. 8. A) What are the three standard triaxial tests with respect to the drainage (6)
Condition? Explain with reasons the situation for which these test js
To be performed?

B) What is liquefanction of sands? How it can be prevented? (6)

C) Explain the procedure for vane shear test and also state the equation for Shear stress of vane shear test.

Q. 9. A) Discuss culmann's graphical method for the determination of active Earth pressure. (6)

B) Explain the assumptions made in theory of earth pressure due to Rankine's (4)

C) What is stability number? What is its utility in the analysis of stability Of slopes? (6)

OR

Q. 10. A) Derive an expression for rankine's active earth pressure on retaining Walls due to a cohesive back-fill. (6)

B) What are the different modes of slope failure? Give examples . (6)

C) Explain coulomb's wedge theory for determination of earth pressure. (6)

Q. 11. A) Write short notes on causes and remedial measures of landslides. (8)

B) Discuss geological classification of rocks. Give example of each Types of rock. (8)

OR

Q. 12.A) What are the different modes of failures of rocks, give examples Of each? (8)

B) list out various index properties of rocks? What is their significance? (8)

UNIVERSITY OF PUNE

[4363]-2A

T. E. Civil (Sem-I)

Construction Techniques

& Machineries

(2003 Course)

Total No. of Questions : 12 **[Total No. of Printed Pages :3]**

[Time : 3 Hours] **[Max. Marks : 100]**

Instructions :

(1) Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 OR Q.6 From section I and Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12 from Section-II

*(2) Answers to the **two sections** should be written in **separate answer-books**.*

(3) Black figures to the right indicate full marks.

(4) Neat diagram must be drawn wherever necessary.

SECTION-I

Q1.

a) How the construction industry is important in the national & global development? [8]

b) With the help of a neat sketch explain various components of conveying equipments. [6]

c) Write a short note on construction difficulties in high rise structures [4]

OR

Q2.

a) What are the various equipment used for material handling? Explain Derric Crane. [8]

b) With the help of a neat diagram explain the manufacturing of precast elements. [6]

c) Explain in brief 'auto-clave curing' [4]

Q3.

a) What are the various methods of underwater concreting? Explain any one of them in detail [8]

b) Write short notes on

1) Fire insulation in construction

2) Slip form pavers [8]

OR

Q4.

a) What are the various methods of dewatering? Explain any one of them in detail [8]

b) Write an explanatory note on RMC plant covering the following points [8]
   1) Advantages of RMC
   2) Production process of RMC
   3) Diagram for RMC plant.

Q5.

a) How the crushing plants for aggregates are classified? Explain any one of them in detail [8]

b) Explain the procedure of construction of flooring structure for high duty industry with a neat sketch [8]

OR

Q6.

a) What are the various pneumatic equipments used in construction? Explain any one of them in detail [8]

b) Write short notes on- [8]
   1) Concrete pump
   2) Ganiting

SECTION-II

Q7.

a) Discuss the concept of selection of an appropriate equipment for construction work. [8]

b) How scraper is useful equipment in road construction work? [6]

c) Write short note on dumpers. [4]

OR

Q8.

a) Distinguish between power shovels & back hoes giving sketches, working operations & utility. [8]

b) How will you prefer trenching machines over other excavating equipments? [6]

c) Explain the cycle time for scrapers. [4]

Q9.

a) Explain slip form pavers considering its applications, advantages, disadvantages & precautions taken in operation of slip form-pavers. [8]

b) What are the important properties of aggregates required in asphalt mix production? Explain it [8]

OR

Q10.

a) Describe in detail the production of bituminous concrete mix at a hot mix plant. [8]

b) Write a short note on [8]

1) Dry clean concrete
2) Pavement quality control

Q11.

a) What do you mean by depreciation? State the different methods of depreciation? Explain any one of them in detail. [8]

b) Write short notes on- [8]

c) Record keeping of equipments

d) Preventive maintenance of equipments

OR

Q12.

a) What do you mean by economic life of an equipment? What are the aspects considered while preparing the life table for the equipments? [8]

b) Write short note on – [8]

1) Overheated cost
2) Equipment working rate

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[4363]-3

T. E. (Civil), Examination - 2013

TRANSPORTATION ENGINEERING-I

(2003 Course)

[Total No. of Questions : 12] **[Total No. of Printed Pages :3]**

[Time: 3 Hours] **[Max. Marks: 100]**

Instructions :

(1) Answer all the questions from each section.

*(2) Answers to the **two sections** should be written in **separate books**.*

(3) Neat diagram must be drawn wherever necessary.

(4) Figures to the right indicate full marks.

(5) Use of electronic pocket calculator is allowed.

(6) Assume suitable data, if necessary

SECTION-I

Q1.

a) Define the gauge? Explain the necessity of uniformity in gauge. [6]

b) Enlist the different types of sleepers used in Indian Railway? [5]

c) Draw cross section of broad gauge railway track in cutting and embankment [5]

OR

Q2.

a) What is creep? What are its effects? Explain how it is adjusted? [6]

b) Write a brief note on organization of Indian Railway and also mention various zones in Indian Railways. [5]

c) Explain how minimum depth of ballast cushion for track is estimated [5]

Q3.

a) Differentiate between under cut and over-riding switches with a sketch. [6]

b) On B.G. railway track, two lines are diverges in opposite directions with 8° curve and 5° curve. If the maximum permissible speed on main line is 52 kmph, calculate the super elevation and speed for branch line. [6]

c) Explain with sketch negative super elevation. State the maximum permissible value for cant and cant deficiency. [6]

OR

Q4.

a) What is the necessity of gradient? Enlist various types of gradient with their permissible values adopted in Indian Railways [6]
b) State the requirement of elastic fastening. Draw a neat sketch of "W clip".[6]
c) Explain: SWR, LWR and CWR. [6]

Q5.

a) Discuss the various measures required to improve the track for high speed[6]
b) Write advantages of Modern Direct Maintenance [6]
c) Explain the use of Turntable and triangle. [4]

OR

Q6. Write Short note on (any four) [16]

1) Diamond Crossing
2) Coning of wheel and tilting of rails
3) Rail failure
4) Sky bus
5) Metro rail
6) Water Column

SECTION-II

Q7.

a) Enlist various factors affecting the choice of tunneling method in Hard Rock. [6]
b) Explain different patterns of drilling. [6]
c) Explain with neat sketch Needle beam method. [6]

OR

Q8.

a) Compare advantages and disadvantages of tunnel with open cut. [6]
b) Draw neat sketch showing different shapes of Tunnels. State the suitability of each shape. [6]
c) Explain in detail heading and benching method of tunneling [6]

Q9.

a) What is mucking? Explain various mucking facilities in tunneling. [6]
b) Explain methods of Ventilation in tunneling with advantages and disadvantages [6]
c) Explain Shotcreting and Rock bolting [4]

OR

Q10. Write short notes on: (any four) [16]

a) Drills blast method.
b) Pilot tunnel.
c) Necessity of dust suppression and requirements of ventilation system.
d) California crossing method.
e) Immersed tubes
f) Advantages and disadvantages of TBM.

Q11. Explain with neat labeled sketches (any four): [16]

1) Fenders
2) Floating dock
3) Marine railway
4) Dolphins
5) Harbor of refugee
6) Jetty

OR

Q12. Explain difference between (any four): [16]

a) Military and fishery harbor
b) Dock and harbor
c) Jetty and Wharf
d) Tribar and Tetra-pod
e) Slipway and dry dock.
f) Commercial and Artificial Harbour

[Total No. of Questions: 12] **[Total No. Printed Pages: 2]**

UNIVERSITY OF PUNE
[4363]- 4
T. E. (CIVIL) Examination – 2013
PROJECT MANAGMENT AND COMPTUER APPLICATIONS
(Course 2003)

[Time: 3 Hours] **[Max. Marks: 100]**

SECTION –I

Q.1 a) With the help of following data draw the network diagram and find out the critical path and total project duration. [18]

Activity	1-2	1-3	1-4	2-5	2-7	3-4	3-6	4-5	5-6	5-7	6-7	7-8
Duration	6	7	8	7	8	4	4	9	5	6	6	9

OR

Q.2 a) State difference between Critical Path Method (CPM) and Program Evaluation and Review Technique (PERT.) [6]

b) Explain the project life cycle for highway project. [6]

c) Define float, what are the uses of float. List out various float. [6]

Q.3 a) Explain the terms-Forward Pass, Backward Pass and Updating. [6]

b) Define Resource Leveling and Resource Smoothening. State under what circumstances Resource Leveling will done [6]

c) What is expected time? How to find expected time of an activity in PERT. [4]

OR

Q.4 The following table gives the cost duration data for the various activities of small construction project. [16]

Activity code i-j	Normal		Crash	
	Duration (Weeks)	Cost (Rs.)	Duration (Weeks)	Cost (Rs.)
1-2	4	20000	2	30000
1-3	16	30000	10	42000
2-4	8	40000	6	48000
3-4	2	14000	2	14000
3-5	4	16000	2	30000

4-6	10	20000	6	32000
5-6	12	24000	4	72000

Carry out stage by stage compression and find the all crash solution and the corresponding total cost if overhead costs are Rs. 6,000 per week.

Q.5 a) List out different types of contracts. Explain any one of them. [6]
b) Write short note on arbitration. [6]
c) Explain the role of Project Manager on any construction site. [4]

OR

Q.6 a) Explain the roles and responsibilities of material manager for any construction site. [6]
b) Explain, how the following materials are stored on construction site? Cement, Aggregates, Steel, Bricks, Paints, Plumbing materials. [6]
c) Explain the function of stores department for any construction site? [4]

SECTION – II

Q.7 a) What are the causes of accident on any construction site? [6]
b) How can you achieve quality control for R.C.C. work and plastering on a residential site? [6]
c) What are the safety precautions to be followed for a tunneling work? [6]

OR

Q.8 a) Draw site layout for a precast bridge project. [6]
b) Explain the role Safety Manager on a construction site. [6]
c) Explain the importance of quality control department on road project. [6]

Q.9 a) Derive the equation for Newton – Raphson method. [8]
b) Find the real root of equation: $x + 9 = 0$ by applying Newton – Raphson method, at the end of 4^{th} iteration. Take the starting point as $x = -2$. [8]

OR

Q.10 a) Draw flow chart and write algorithm for two point Gauss Quadrature Method of Numerical Integration. [8]
b) Write the flow chart for Langrangian Interpolation. [8]

Q.11 a) Explain the use of computer softwares in construction industry [4]
b) Discuss the procedure for generation of a purchase order. [6]
c) Explain Data Base Management System in context with construction industry [6]

OR

Q.12 Write short notes on :
i) Quality Control [4]
ii) Daily reports on construction site. [6]
iii) Indent order. [6]