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Bharatiya Vidya Bhavan's

Sardar Patel College of Engineering

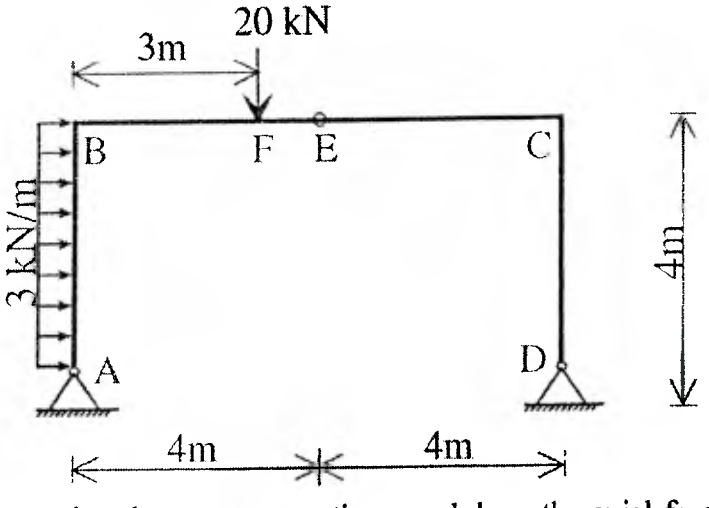
(A Government Aided Autonomous Institute)
Munshi Nagar, Andheri (West), Mumbai – 400058.
End Semester Exam
May 2016

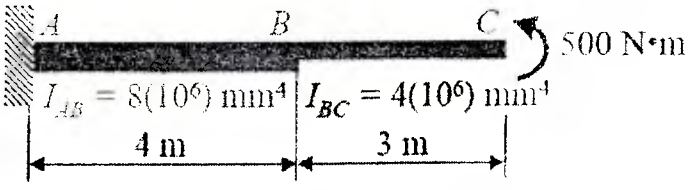
Max. Marks: 100 Duration: 3 hrs
Class: SE Civil Semester: IV Program: UG
Name of the Course: STRUCTURAL ANALYSIS I Course Code : BTC 203

File no. 2.

Instructions:

1. Attempt any five questions.
2. Illustrate your answers with neat sketches wherever required, though not sought specifically.
3. Assume suitable data if necessary.

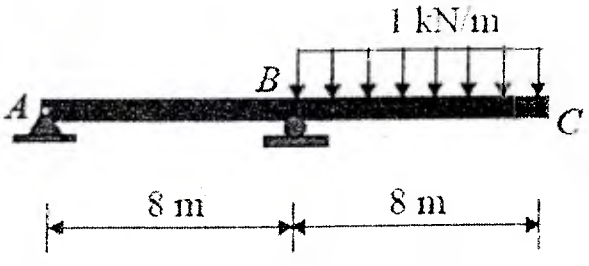
Question No		Maximum Marks	Course Outcome Number	Module No.
		(15)	(1)	(1)
Q1	 Determine the support reactions, and draw the axial force, shear force and bending moment diagrams for the frame. Joints B and C are rigid joints and Joint E is an internal hinge of the frame.			
b)	State and explain Castigliano's theorem.	(5)	(1)	(2)
Q2	Determine the slope and deflection at points B and C of the beam shown in the figure. Values for the moment of inertia of each segment are indicated in the figure. Take E = 200 GPa. Use Moment-area method.	(10)	(2)	(3)



Determine the slope at point C of the beam using Conjugate beam method.
$E = 200$ GPa and $I = 250(10^6)$ mm^4.

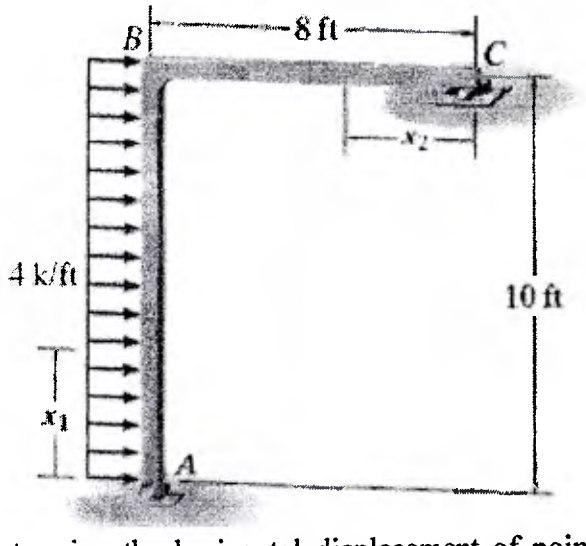
(10) (2) (3)

b).



(10) (2) (3)

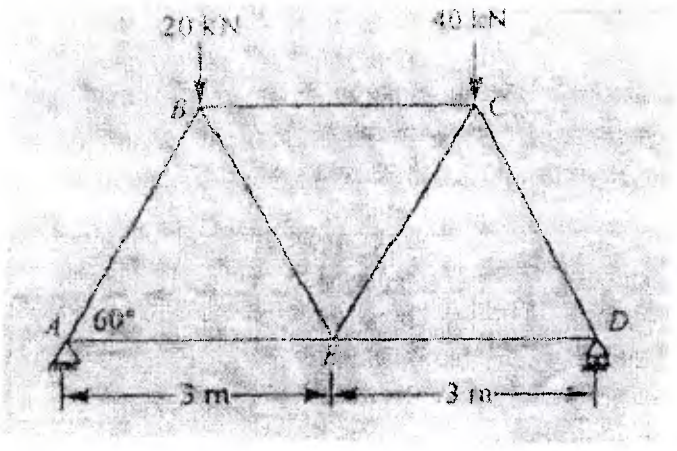
Q3



Determine the horizontal displacement of point C on the frame shown in Fig. Take E= $29(10^3)$ ksi and I = 600 in^4 for both members.

b) Find the vertical deflection of the joint E of the truss shown in Fig. The cross sectional area of each member is 500 mm^2; E = 200 kN/mm^2.

(10) (2) (3)



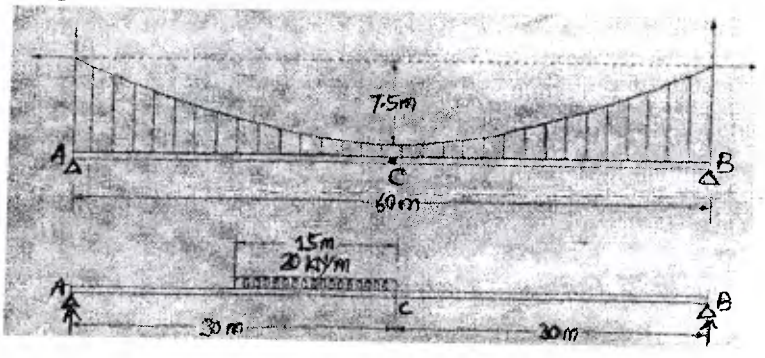
(15) (4) (5)

Q4 A symmetrical three hinged arch has a span of 20 meters and a rise of 4 m. The arch carries a uniformly distributed load of 10 kN/m over the entire span. It also carries two concentrated loads of 40 kN each at 2m and 5m from left support.
Compute the reactions. Also determine the BM, radial shear and normal thrust at a section 4 m from left end.

b). Distinguish between an arch and a cable. (5) (4) (5)

(20) (4) (6)

Q5 The cables of a suspension bridge have a span of 60m and a central dip of 7.5m. Each cable is stiffened by a girder hinged at the ends and also at the middle so as to retain a parabolic shape for the cables. The girder is subjected to a dead load of 10 kN/m and a live load of 20kN/m, 15m long.



(a) Find the maximum tension in the cable when the leading edge of the live load is just at the centre of the girder.
(b) Draw also SF and BM diagrams for the girder.

Q6 For a simply supported beam of span 10m, draw influence line diagram for (10) (3) (4)

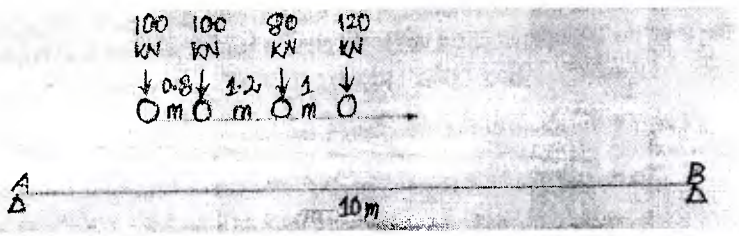
(a) reaction at left support A and right support B

(b) shear force at a section C, 3m from left support A

(c) bending moment at a section C, 3m from left support A

The load system shown in Fig. moves from left to right on a girder of span 10 meters. Find maximum bending moment which can occur under the 80 kN load. (10) (3) (4)

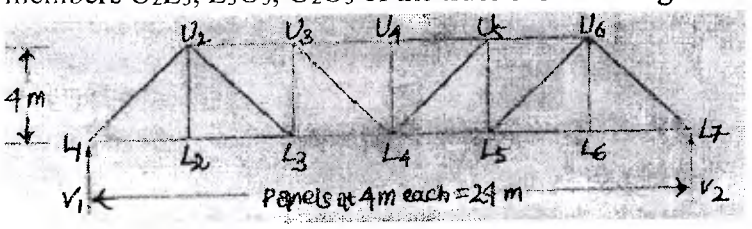
b)



Q7 Find Euler's critical buckling load for a hollow cylindrical cast iron column 200mm external diameter and 25mm thick, if it is 6 meter long and hinged at both the ends. Take $E = 8 \times 10^4$ N/mm^2. Compare Euler's critical load with the Rankine's critical load taking fc = 550 N/mm^2 and Rankine's constant as 1/1600. (10) (5) (7)

Draw the influence line diagrams for the forces in the members U_2L_3, L_3U_3, U_2U_3 of the truss shown in Fig. (10) (3) (4)

b)



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Sardar Patel College of Engineering

(A Government Aided Autonomous Institute)
Munshi Nagar, Andheri (West), Mumbai – 400058.
End Semester Exam
May 2016

Max. Marks: 100 Duration: 3 Hours
~~Class: SY~~ Semester: IV Program: B.Tech
Name of the Course: Concrete Technology Course Code : BTC230
civil

Instructions:

- Q1 is compulsory to attend
- Assume appropriate any missing data

Master file.

Question No		Maximum Marks	Course Outcome Number	Module No.
Q1.(a)	Briefly explain Rapid hardening cement and their uses.	05		1
(b)	Define aggregate. List the characteristics of it which affects the concrete.	05		
(c)	List the types of cement. Briefly explain hydrophobic cement and their uses	05		
(d)	Define bleeding in concrete. Briefly explain the purpose of adding admixtures	05		
Q2. (a)	Explain in details Slump Test for concrete with a neat sketch	7		2
(b)	Explain Tremie method of concreting with neat sketch.	8		
(c)	Explain the precaution required during under water concreting.	5		
Q3.(a)	Design a concrete mix for M40 grade of concrete with the following data using IS:10262 code Type of cement : OPC 43 grade Maximum size if aggregate: 20 mm Workability : 100 mm slump Minimum cement content : 320 Kg/m^3 Take w/c ratio: 0.40 Method of placing concrete: pumping Type of aggregate : crushed angular Admixture : Super plasticizer Specific gravity of Coarse agg : 2.75 Specific gravity of fine agg : 2.65 Grading of fine agg : Zone III Dosage of admixture: 1.1% weight of cement	20		3

	Specific gravity of admixture : 1.2			
Q4. (a)	Define High Performance Concrete. Discuss the advantages of HPC over ordinary concrete.	06		4
(b)	List out the salient requirements of High performance concrete	07		
(c)	What are the factors which control the performance of HPC	07		
Q5.(a)	What are the advantages and disadvantages of ready mix concrete?	06		5
(b)	Give a typical layout of the site for Ready mix concrete plant. Explain in details about transit mixer of Ready mix concrete	14		
Q6. (a)	What do you mean by Fiber Reinforced Concrete? List out its types, application, advantages and disadvantages of FRC	10		6
(b)	What do you mean by Polymer concrete? List out its types and advantages of Polymer concrete.	10		
Q7. (a)	Explain in details Ultrasonic pulse velocity test with neat sketch	10		7
(b)	Define NDT. Briefly explain half cell potentiometer test with neat sketch	10		

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Sardar Patel College of Engineering

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Munshi Nagar, Andheri (West), Mumbai – 400058.
Re Examination
June 2016

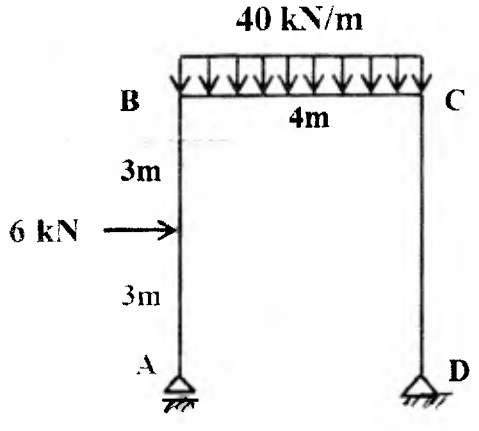
Max. Marks: 100 Duration: 3 Hours
Class: SY B.Tech Semester: IV Program: BTech in Civil Engineering
Name of the Course: **Structural Analysis-I** Course Code : **BTC 228**

Master file.

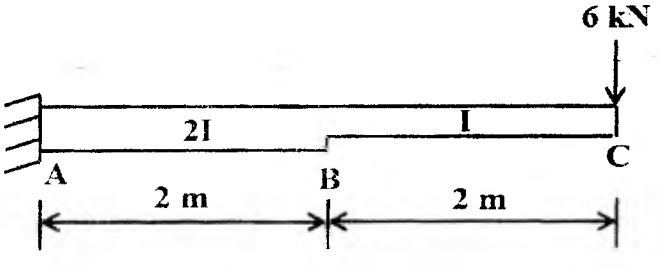
Instructions:

- Attempt any FIVE questions out of SEVEN questions.
- If there are sub 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.

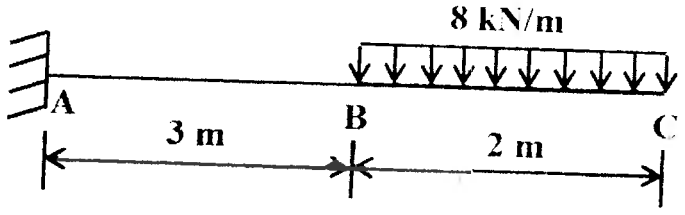
Question No		Max Marks	Course Outcome Number	Module No.
Q.1 (a)	For the frame loaded as shown in figure below a) Find the support reactions (b) Draw AFD, SFD & BMD	(15)	1	1



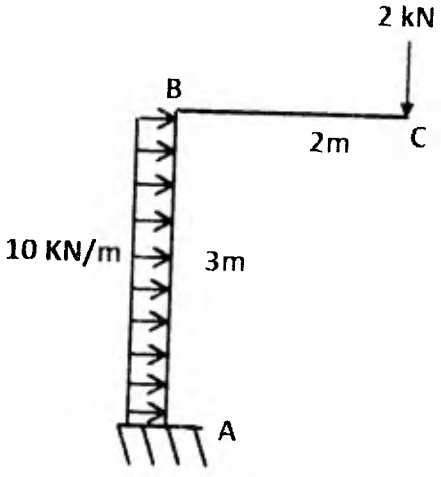
Q.1 (b)	State and explain Maxwell's reciprocal theorem.	(05)	1	2
Q.2 (a)	Find the slope and vertical deflection at C for the beam supported and loaded as shown in figure below. Use moment area method only.	(10)	2	3



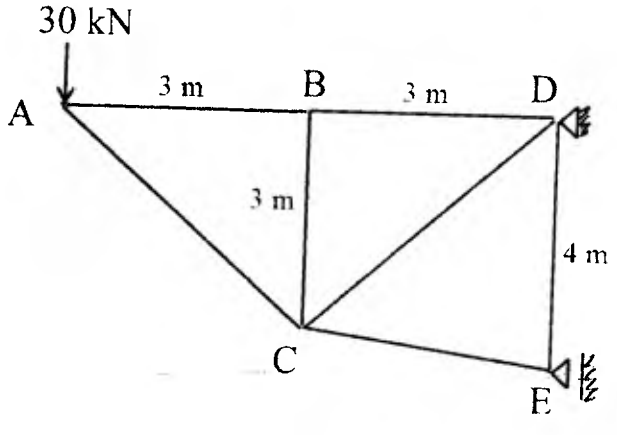
Q.2 (b) Find the slope and vertical deflection at C for the beam supported and loaded as shown in figure below. Use conjugate method only. (10) 2 3



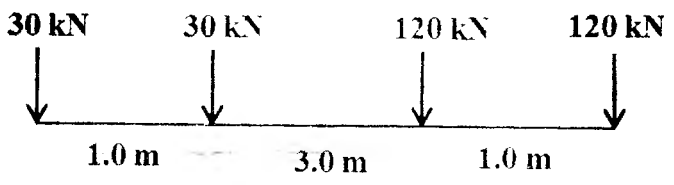
Q.3 (a) Determine the vertical deflection at C of the rigid jointed frame loaded as shown in figure below. (10) 2 3



Q.3 (b) For the pin jointed frame loaded as shown in figure below, find the vertical deflection of joint A. (10) 2 3



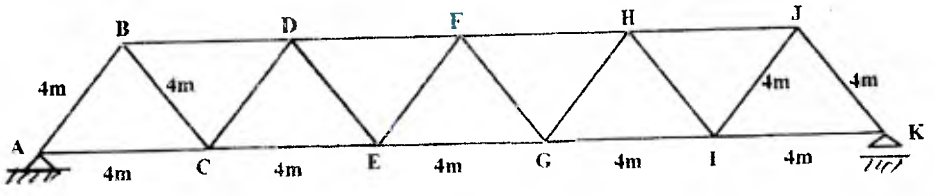
Q.4 (a)	A symmetrical three hinged segmental arch of span 40 m and central rise of 4 m is subjected to a udl of 340 kN/m on the left half horizontal span of the arch and a concentrated loads of 150 kN at 25 m from the left support. Determine (a) the support reactions (b) radial shear, normal thrust and BM just to the left of 150 kN load (c) draw BMD	(15)	4	5
Q.4 (b)	State the advantages and disadvantages of an arch over a beam of same span.	(05)	4	5
Q.5	A suspension cable of span 100 m and a central dip of 12 m is supporting a three hinged stiffening girder. The dead load of the girder is 10 KN/m. A point load of 250 KN acts on the girder at a distance of 30 m from the left support. (a) Determine the maximum and minimum tension in the cable (b) Draw SFD and BMD for the girder If the suspension cable passes over a smooth pulley on the top of a pier of height 20m and the anchor cable is at 45^{o} to the horizontal, find the forces transmitted to the base of the pier.	(20)	4	6
Q.6 (a)	For a simply supported beam of span 8 m with an overhang of 2m over the right support B, draw influence diagrams for a) reaction at left support A b) shear force at a section C, 3 m from left support A c) bending moment at a section C, 3 m from left support A	(10)	3	4
Q.6 (b)	The load system shown in figure below crosses a simply supported girder of span 30 m. Determine the value of maximum positive shear force at a section 10 m from left support.	(10)	3	4



Q.7 (a) Compare the crippling loads given by Euler's and Rankine's formulae for a steel column 5.0 m long and fixed at both the ends. The cross section of the column is a symmetrical I section with the following dimensions. (10) 5 7

Top and bottom Flange width = 300 mm.
Top and bottom Flange thickness = 20 mm,
Depth of web = 200 mm, Thickness of web = 20 mm.
Take $E = 2 \times 10^5$ N/mm^2, $f_c = 350$ Mpa and Rankine's constant as 1/7000.

Q.7 (b) For the pin jointed frame shown in figure below draw influence diagram for axial force in members FH, GH and GI. (10) 3 4



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Bharatiya Vidya Bhavan's

Sardar Patel College of Engineering

(A Government Aided Autonomous Institute)
Munshi Nagar, Andheri (West), Mumbai – 400058.

End Semester Exam, May-2016

Max. Marks: 100
Class: S.Y.B.Tech. Semester: IV
Name of the Course: Surveying-II

Q. P. Code:
Duration: 3 hour
Program: Civil
Course Code : **BTC- 227**

Master file.

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

Question No		Maximum Marks	Course Outcome Number	Module No.
Q1	(a) Explain the working principle of electronic tacheometer.	**05**	C.O.1	3
	(b) In a Triangle PQR, the angles P, Q and R were observed as 75^0, 55^0, and 50^0. The line PR was used as base line of known length and error d for the distance angles is 3. Calculate the strength of the figure? (Note: All stations were occupied and all the angles were measured)	**05**	C.O.1	7
	(c) Explain the procedure for transfer of alignment inside the tunnel.	**05**	C.O.1	6
	(d) Explain the use of tacheometric tables for calculating distance and elevation with suitable example.	**05**	C.O.3	5
Q2	**a)** An upgrade of + 1.8 % meet with another upgrade of + 1.2 %. Determine the reduced levels of the various stations on the curve using **chord gradient method.** Assume rate of change of grade to be 0.05% per 20 m chain and the chain age and elevation of the point of grade separation are 1400 m and 380 m, respectively.	**10**	C.O.1	2
	b) Classify precise levelling and discuss the guidelines followed in method of precision levelling.	**10**	C.O.1	4
Q3	**(a)** Prepare data necessary to set out a composite curve using deflection angular method from following details: R = 250 m, Angle of deflection = 60^0, length of transition curve = 100 m. Consider chainage of PI is 1600 m and peg interval of 20 m for setting out transition as well as circular curves.	**12**	C.O.1	2
	(b) Discuss in detail the procedure for setting out culvert.	**08**	C.O.4	6

Q4	**(a)** A closed traverse ABCDEA was run using a tacheometre fitted with analytic lens and staff kept vertical. Calculate the missing length and bearing of line EA from the following data (Assume K= 100):	**12**	C.O.1	5
	(b) How will you overcome the difficulty in setting out curve when both point of intersection and point of commencement are inaccessible?	**08**	C.O.1	1
Q5	**(a)** Discuss in brief different systems of Triangulation. How will you measure strength of a figure?	**10**	C.O.1	7
	(b) Two tangents intersect at a chainage of 2450 m and angle of intersection between them is 130^0. Enumerate the data required for simple curve having back tangent length = 116.58 and Peg interval = 30 m using Rankine's method.	**10**	C.O.1	1
Q6	**(a)** Derive an expression for horizontal distance and elevation using tangential system when both the angles are of elevation.	**10**	C.O.1	5
	(b) Discuss use of computer in survey work for level computation and plotting contour plan?	**05**	C.O.3	3
	(c) Explain with neat sketch elements of a Reverse curve.	**05**	C.O.1	2
Q7	**(a)** Explain in detail the procedure for setting out combined curve by deflection angle method.	**10**	C.O.1	2
	(b) Write short notes on any two	**10**		
	(i) Total station		C.O.1	3
	(ii) ideal transition curve		C.O.1	2
	(iii) Base line measurement		C.O.1	7

Inst. Station	Staff station	Staff intercept	Vertical angle	Bearing
A	B	0.35	+ 5 ° 30'	AB = 71° 30'
B	C	0.29	- 3 ° 45'	BC = 118 ° 40'
C	D	0.27	+ 6 ° 12'	CD = 206 ° 20'
D	E	0.31	-5 ° 30'	DE = 243 ° 15'

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End Semester Re-exam, June 2016

Max. Marks: 100
Class: S.Y.B.Tech. Semester: IV
Name of the Course: Surveying-II

Q. P. Code:
Duration: 3 hour
Program: Civil
Course Code : **BTC- 227**

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

Question No		Max. Marks	Course Outcome Number	Module No.
Q1	(a) Discuss in brief different type of EDM instruments. (b) What is precise levelling? How it is different than ordinary levelling? (c) What is subtense Theodolite? Where it is used? (d) Highlight the significance of setting out in Civil Engineering project.	**05** **05** **05** **05**	C.O.1 C.O.1 C.O.1 C.O.1	3 4 5 6
Q2	**a)** The following observations were made with a tacheometre having K=100 and C=0.2. Find the R.L. of stations M, N and P considering staff held **vertical.**	**10**	C.O.1	5
	b) Describe in detail the method of setting out curve using offsets from chord produced.	**10**	C.O.1	1
Q3	**(a)** A vertical curve of 160 m length was proposed to join a down grade of -0.7% with an upgrade of + 0.4%. Determine the RLs of different points by tangential correction method. Assume peg interval of 20 m, and the chain age and elevation of the point of grade separation are 1700 m and 240 m, respectively.	**10**	C.O.1	2

Inst. St^n	Staff St^n	HI	Stadia readings	Vertical angle	Remark
O	M	1.12	1.325 1.570 1.815	-3 ° 52'	RL of O = 135.50 m
O	N	1.12	2.225 2.540 2.855	+ 4° 32'	
N	P	1.20	0.980 1.220 1.460	+ 5° 15'	

	(b) Derive an expression for the horizontal distance and elevation of staff station, when the staff is held **normal** to the line of sight and vertical angle is an angle of depression.	**10**	C.O.4	5
Q4	**(a)** Find the elevation difference between two stations with the following data: (i) PQ distance = 14,600 M (ii) R.L. of P = 125.60 M (iii) Angle from P to Q = + 2^0 23' (iv) Height at signal at Q = 8.97 M (v) Height of instrument = 1.52 M	**10**	C.O.1	7
	(b) How will you carry out setting out work of a sewer line?	**10**	C.O.4	6
Q5	**(a)** What is centrifugal ratio? How it affects the design of transition curve?	**05**	C.O.1	2
	(b) What is three wire levelling?	**05**	C.O.1	4
	(c) Describe in detail field work and computational work required for the 'tacheometric project 'conducted in the survey camp.	**10**	C.O.1	5
Q6	**(a)** What is ideal transition curve? Derive an intrinsic equation for the same?	**10**	C.O.1	2
	(b) A compound curve is to connect two straights having deflection angle of 70^0. The lengths of two tangents are 215.18 m & 243.54 m respectively. Calculate the radius of second arc, if the radius of the second arc is to be 268 m.	**10**	C.O.3	1
Q7	**(a)** Determine versed sine, mid ordinate, back tangent and long chord for a 3 degree curve (arc length 30 m) with deflection angle of 64^0.	**05**	C.O.1	1
	(b) Calculate the horizontal distance between Theodolite and a subtense bar, if the distance between disc was 3 meter and angle subtended at Theodolite was 0° 44'20".	**05**	C.O.1	5
	(C) Write short notes on the following:			
	(i) Towers and signals	**05**	C.O.1	7
	(ii) Global positioning system	**05**	C.O.1	3

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Sardar Patel College of Engineering

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Munshi Nagar, Andheri (West), Mumbai – 400058.
End Semester Re-Exam
June 2016

Max. Marks: 100 Duration: 04 Hours
Class: S.Y.B.Tech. (Civil) Semester: IV Program:
Course: **Building Design and Drawing I** Course Code : **BTC231**

Master file.

Instructions:

1. Q.1 is compulsory.
2. Out of remaining **six** questions, attempt **any four** questions.
3. In all **five** questions to be attempted.
4. Attempt each question on a fresh page (use both sides of the sheet)
5. Answers to the theory questions should be written on the drawing sheet only
6. Assume suitable data wherever required and state it clearly

Question No		Max. Marks	Course Outcome Number	Module No.
Q.1	A load bearing residential single storey structure is to be planned for a PWD chief Engineer in a on a plot of land 25m x 20m. The compound wall of 25m side of the plot is common to a municipal park of 25m x 18m and the 20m side of the plot is to the east side adjoining a 3.5m wide lane and is having the entrance gate to the plot. The maximum permissible plinth area is 150sq.m. The following accommodation areas are to be provided: a) Living room – 25sqm b) Children's bed room – 15sqm c) Master bed room – 15sqm d) Kitchen cum dining room – 20sqm e) store room and pooja room – 10sqm each f) Chief Engineer's office – 10sqm. Provide adequate passage, verandah, stair, terrace and sanitary units.			
Q.1.a	Design and draw the ground floor plan for building designed in Q.1.	**12**	**1,2,3**	**1-7**
Q.1.b	Draw the line floor plan of the first floor for building designed in Q.1.	**08**	**1,2,3**	**1-7**
Q.2.a	Draw the site plan for the structure designed in Q.no.1 with the area statement indicating the FSI utilized for the plot. The permissible FSI is 0.5.	**05**	**1**	**1-6**

Q.2.b	State the principles of planning and designing a residential building. Explain any four principles in detail with proper sketches.	**15**	**1,2,3**	**1-6**
Q.3.	State the essentials to be shown in a foundation plan and section. Draw the foundation plan with a detailed section showing, the plinth details, footing details and the wall details you have designed for the building in Q.no.1.	**20**	**1,2,3**	**1,5,6**
Q.4.a	State the general byelaws that you have followed while planning the residential structure.	**05**	**4**	**3**
Q.4.b	Design and draw the plan and complete section (showing overhead water tank, staircase ~~headroom~~) of the ~~terrace provided~~ for the building designed in Q.no.1	**15**	**1,2,3**	**1,5,6**
Q.5.a	Give the standard sizes of sanitary units and state the advantages of providing dado and loft	**05**	**1**	**1,6**
Q.5.b	Draw a typical section of simply supported king post roof truss for a span of 8m showing all its components and joints.	**15**	**1,2,3**	**1,6**
Q.6.a	Draw the elevation of the structure designed in Q.no.1.	**05**	**1**	**1,5,6**
Q.6.b	Draw the detailed sectional elevation of the building designed in Q.no.1. The section should pass through sanitary unit and other important components of the building.	**15**	**1,2,3**	**1,5,6,7**
Q.7.a	Draw a neat detailed section of a RCC column with isolated footing showing the structural components and typical reinforcement. Assume column size of (350 x 350) mm.	**08**	**1,3,4**	**1,5,6**
Q.7.b	Draw the detailed section of (any 2) 1. Typical details of water proofing in sunken slab provided for the sink in kitchen 2. Typical details of a RCC chajja with lintel. 3. Typical structural details of a R.C.C. simply supported T-beam 4. Typical structural details of staircase (first flight)	**12**	**1,3**	**1,5,6**

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Bharatiya Vidya Bhavan's

Sardar Patel College of Engineering

(A Government Aided Autonomous Institute)

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

Re Examination

June 2016

Max. Marks: 100 **Semester:** V **Duration:** 3 hours

Class: T. Y. B. Tech. **Program:** Civil

Name of the Course: Geotechnical Engineering I **Course Code:** CE302

Master file.

Instructions:

1. Question No. 1 is compulsory.
2. Attempt **any four** out of remaining six questions.
3. State clearly any assumptions made and state units for all quantities.
4. Assume suitable data if necessary and state the same clearly.

Q. No.			Max. Marks	Course Outcome Number	Module
1	a	Explain critical gradient and quick sand condition.	05	2	3
	b	What is relative density? State its equation.	05	2	2
	c	Draw the three phase diagram for soil and define e, n, w and Sr.	05	1	1
	d	Differentiate between compaction and consolidation.	05	3	4
2	a	State and derive the relationship between major and minor principal stresses.	10	3	6
	b	Explain the various causes of slope failure	05	3	7
	c	Determine the liquid limit of soil based on the following data obtained from the laboratory.	05	2	2

Trial No.	1	2	3	4
Weight of water (gm)	3.1	6.5	12.1	6.5
Weight of dry soil (gm)	9.2	13.8	21.8	11
Number of blows	30	20	15	13

3	a	Explain Terzaghi's spring analogy of one dimensional consolidation	10	1	5
	b	The sieve analysis of a soil gave % passing 75 micron sieve as 4%, % passing 4.75 mm sieve as 78%, coefficient of curvature as 1.8 and coefficient of uniformity as 12.3. Classify the soil as per IS 1498-1970.	10	2	2
4	a	Explain in detail by drawing a typical graph the method to determine coefficient of consolidation by square root of time method.	10	2	5
	b	Draw a typical borelog and explain its importance in a	05	4	7

		construction project.			
	c	Explain the terms total stress, effective stress and neutral stress	05	1	4
5	a	State and derive the Laplace equation for flow nets	10	1	3
	b	An unconfined compression test on a soil sample shows failure at 1.5 kg/cm^2. The failure plane makes an angle of 50^o to the horizontal. Calculate c and ϕ.	05	3	6
	c	State the importance of performing soil exploration for any construction project	05	4	7
6	a	Triaxial test was performed on an undisturbed soil sample with drainage permitted. Determine the shear parameters. State if they are total or effective parameters.	10	3	6

kN/m^2	Test 1	Test 2	Test 3	Test 4
Deviator Stress	447	167	95	37
Cell pressure	246	89	36	6

	b	Explain the core cutter method of determining field density.	05	1	1
	c	Explain the terms initial, primary and secondary consolidation.	05	2	5
7	a	A standard Proctor test was performed in the laboratory and the following readings were noted. Determine the OMC and MDD.	10	3	4

Bulk Unit Weight (g/cc)	1.62	1.89	2.09	1.96	1.7
Moisture Content (%)	10	11	12.8	14.5	16

	b	Explain briefly the SPT test as per IS 2131	05	4	7
	c	If the coefficient of permeability of a soil at void ratio of 0.57 is 3.2 x 10^{-6} cm/s then determine its value at a void ratio of 0.65.	05	2	3

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Bharatiya Vidya Bhavan's

Sardar Patel College of Engineering

(A Government Aided Autonomous Institute)
Munshi Nagar, Andheri (West), Mumbai – 400058.
End Semester Exam
May 2016

Max. Marks: 100 Duration: 04 Hours
Class: S.Y.B.Tech. (Civil) Semester: IV Program:
Course: **Building Design and Drawing I** Course Code : **BTC231**

Instructions:

Master file.

1. Q.1 is compulsory.
2. Out of remaining **six** questions, attempt **any four** questions.
3. In all **five** questions to be attempted.
4. Attempt each question on a fresh page (use both sides of the sheet)
5. Answers to the theory questions should be written on the drawing sheet only
6. Assume suitable data wherever required and state it clearly

Question No		Max. Marks	Course Outcome Number	Module No.
Q.1	A load bearing residential G+1 structure is to be planned for a General Physician in a rural area on a plot of land 15m x 25m. The 15m side of the building is to the east side adjoining a 7m wide lane. The maximum permissible plinth area is 100sq.m. The following accommodation areas are to be provided: a) Living room cum drawing hall b) Children's bed room, Master bed room with attached combined bathroom. c) Kitchen cum dining room, store room, pooja room d) Doctor's clinic having an outside entry for the patients. Provide adequate passage, verandah, stair and sanitary units.			
Q.1.a	Design and draw the ground floor plan for building designed in Q.1.	**12**	**1,2,3**	**1-7**
Q.1.b	Draw the line floor plan of the first floor for building designed in Q.1.	**08**	**1,2,3**	**1-7**
Q.2.a	Explain the importance of 'site plan' and 'location plan'. Sate the elements that are necessary to be shown in the site plan?	**05**	**1**	**1-6**

Q.2.b	Draw the location plan and site plan of the building designed in Q.no.1. Give the area statement for the proposed construction in the plot.	**15**	**1,2,3**	**1-6**
Q.3.a	Explain the importance of providing Foundation plan and section in working drawings. State the essentials to be shown in the foundation plan of a RCC structure	**05**	**1**	**1,5,6**
Q.3.b	Draw the foundation plan with a detailed section showing, the plinth details, footing details and the column details you have designed for the building in Q.no.1	**15**	**1,2,3**	**1,5,6**
Q.4.a	State the byelaws that you have followed while planning a stair for a residential building.	**05**	**4**	**3**
Q.4.b	Design and draw the plan and complete section (from foundation to headroom) of the stair provided for the building designed in Q.no.1	**15**	**1,2,3**	**1,5,6**
Q.5.a	Enlist various types of pitched roofs and state the advantages of providing pitched roof for residential buildings.	**05**	**1**	**1,6**
Q.5.b	Draw a typical section of simply supported steel roof truss for a span of 10m showing all its components and joints.	**15**	**1,2,3**	**1,6**
Q.6.a	Explain the term 'Elevation'. State the difference between elevation and sectional elevation.	**05**	**1**	**1,5,6**
Q.6.b	Draw the detailed sectional elevation of the building designed in Q.no.1. The section should pass through sanitary unit and other important components of the building.	**15**	**1,2,3**	**1,5,6,7**
Q.7.a	State the importance of providing structural drawings for any building. State the structural components of load bearing structure and RCC structure for which drawings are necessary.	**05**	**1,3,4**	**1,5,6**
Q.7.b	Draw the detailed section of (any 3) 1. Typical details of water proofing over terrace 2. Typical details of water proofing in sunken slab in sanitary units 3. Typical structural details of a R.C.C. chajja 4. Typical structural details of a UCR masonry in load bearing foundation for an external wall. 5. Typical structural details of a R.C.C. simply supported slab for a load bearing structure	**15**	**1,3**	**1,5,6**

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Bharatiya Vidya Bhavan's

Sardar Patel College of Engineering

(A Government Aided Autonomous Institute)
Munshi Nagar, Andheri (West), Mumbai – 400058.
End Semester Exam
May 2016

Max. Marks: 100
Class: S.Y.B.Tech ~~Semester: IV~~
Name of the Course: Fluid Mechanics

Q. P. Code:
Duration: 3 Hrs
Program: Civil Engineering
Course Code : BTC229

Master file.

Instructions:

1. **Question no 1 is compulsory & attempt any four** out of remaining six questions.
2. **Illustrate answer with neat sketches wherever required.**
3. **Make suitable assumptions where necessary and state them clearly.**

Question No		Maximum Marks	Course Outcome Number	Module No.
Q1	Write a short note on the following terms (any four) a) Capillarity b) Metacentric Height c) Flow net d) Borda's mouthpieces e) Uniform flow f) Relative Equilibrium	20	1 & 2	1-7
Q2	**A)** Derive expression for Total pressure & Centre of pressure, when it acts on Inclined plane surface under fully submerged conditions.	08	2	2
	B) The diameter of small piston & large piston of hydraulic jack are 3.5 cm & 11.5 cm respectively. A force of 75 KN is applied on the small piston. Find the load lifted by large piston, when 1) the pistons are at same level 2) small piston is 40 cm above the large piston	06	2	
	C) Derive an expression for U-Tube differential Manometer.	06	2	
Q3	**A)** Explain the different types of fluid pattern in fluid kinematics	08	1	3
	B) Write a short note on Pitot tube & Rotameter	06	1	
	C) A two dimensional flow is described by the velocity components, $u = 5x^3$, $v = -15x^2y$. Evaluate the stream functions, velocity & acceleration at point p (1.2)	06	1	
Q4	**A)** Derive an expression of hydraulic coefficients for sharp edged orifices discharging free.	08	1	4
	B) Derive an expression for time emptying a tank through an orifice at its bottom.	06	1	

	C) Explain the difference between notch & weir with sketches. Why ventilation is provided in the notch?	06	1	
Q5	**A)** Explain a (flow past Rankine oval body). Also obtain expression for the following terms: i. Location of stagnation point. ii. Max Width of a body. iii. Dimension of rankine oval.	12	1 & 2	5
	B) Discuss the following cases of Ideal flow with their equation of stream & velocity potential function. A) Free vortex flow B) source flow	08	1 & 2	
Q6	**A)** Write a short note on Mach number. Also explain a) Mach Cone b) Mach Angle	08	2	6
	B) Derive area velocity relationship for compressible fluids.	06	2	
	C) Find the mach number when an aircraft is flying at 800 km/hr through still air having pressure of 84 KN/m^2 & temperature of - 6 degree cel. Take R= 287.14 J/Kg.K. Calculate the pressure, density & temp at stagnation point. Take K= 1.4	06	2	
Q7	**A)** A rectangular tank 2.5 m wide, 3.0 m long & 3.5 m deep contains water to depth of 2.0 m. find the horizontal acceleration which may be imparted to the tank in the direction of its length so that (a) there is no spilling of water from the tank (b) the front bottom corner of the tank is just exposed (c) the bottom of tank is exposed up to its mid-point. Calculate the volume of water that would spill out from the tank in case of (b) & (c) Also calculate the total forces on each end of the tank in each of the cases & show that difference between the forces equals the unbalanced force necessary to accelerate the liquid mass in the tank.	12	2	7
	B) Derive an expression for fluid masses subjected to acceleration with inclined plane.	04	2	
	C) In above tank (refer Q.7.A), if oil is filled upto total height of tank. Find the force acting at side of the tank when 1) Vertical acceleration is 4.5 m/s^2 acts upward 2) Vertical acceleration is 4.5 m/s^2 acts downward	04	2	