Bharatiya Vidya Bhavan's

SARDAR PATEL COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)
Munshi Nagar, Andheri (W) Mumbai – 400058

13

Pervious Semester Examination December 2019

Program: B. Tech in Civil Engineering
Course Code: BTC230 / PC-BTC403
Course Name: Concrete Technology

Duration: 3 hours
Maximum Points: 100
Semester: IV

Notes:

- Answers to all sub questions should be grouped together.
- Answer any 5 questions out of 7.
- Figures to the right indicate full marks.
- Assume suitable data, if necessary and state the same clearly.

Q. No.		Questions	Points	CO	BL	PI
Q.1	a.	Explain the phenomenon of alkali silica reaction and how to mitigate it.	10	1	2	1.6.1
	b.	What are different tests conducted for assessing the workability of concrete. Explain compaction factor test in detail.	5	1	2	1.6.1
	c.	For each given situation below, suggest the type of admixture to be used in concrete: a. Achieve higher workability of concrete, without increasing water content. b. Prolong the rusting of reinforcement c. Reduce capillary pores in concrete d. Keep workability constant for 4 hours e. Reduce setting time of concrete from 12 hours to 8 hours	5	3	2	1.6.1
Q.2	a.	Explain the mechanism of deterioration of concrete due to sulphate attack and how to mitigate it.	10	3	1	1.6.1
	b.	Explain the phenomenon of carbonation of concrete. Detail various factors that affect the rate of carbonation.	10	3	1	1.6.1
Q.3	a.	Why is curing of concrete important? Give four methods of curing in one sentence each.	5	3	2	1.6.1
	b.	Specify the type of concrete to be used in the following situations: a. Concrete used for pavements in building campus for maintaining the existing ground water table b. Build structure to counter any extreme impact loads c. Eliminate expansion joints in bridges d. Support roof of tunnel after excavation e. Absorb radiation from nuclear reactors	5	2	4	1.7.1
	c.	Explain situations where non-destructive testing may be required? Explain any four NDT tests in one sentence each.	10	3	2	1.6.1
Q.4	a.	Explain briefly following types of cements and their use. Portland Pozzolana Cement Sulphate Resistant Cement	10	1	1	1.6.1
	b.	Explain the phenomenon of bleeding and segregation in concrete. Describe various methods of controlling them.	5	1	2	1.6.1
	c.	Define role of aggregates in concrete. Describe briefly 3 characteristics of aggregate which affect concrete properties.	5	1	1	1.6.1
Q.5	a.	Explain briefly the layout of batching plant at site. Explain different components of batching plant and their utility.	10	3	5	1.6.1
	b.	What are the advantages and disadvantages of ready-mix concrete?	5	3	5	1.6.1
	c.	Explain any five methods for transportation of concrete.	5	3	5	1.6.1
Q.6	a.	Describe in detail the experiment conducted for evaluating the compatibility of admixture with cement	10	1	1	1.6.1
	b.	Explain any two types of strengthening techniques for concrete beam or column giving the method, advantages and disadvantages.	10	3	1	1.6.1

Bharatiya Vidya Bhavan's

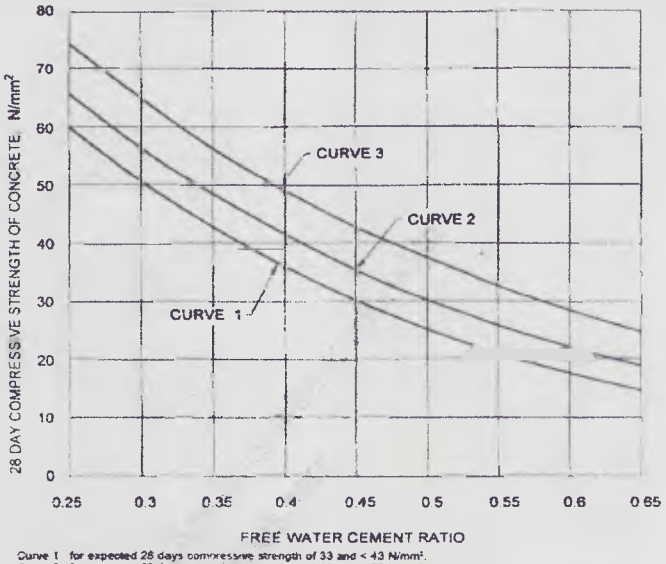
SARDAR PATEL COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)

Munshi Nagar, Andheri (W) Mumbai – 400058

Pervious Semester Examination December 2019

Q.7		Design concrete for M40 grade using guidelines given in IS 10262 for the following data. Do the moisture correction of aggregate and calculate the final mix proportions. (Assume data, if not given) Grade of concrete – M40 Strength of cement – 60 MPa Maximum size of aggregate – 20 mm Minimum cement content – 350 kgs Maximum water cement ratio – 0.45 Workability – 120 mm Method of placement – Pumpable Specific gravity of 20 mm aggregate – 2.72 Specific gravity of 10 mm aggregate – 2.71 Specific gravity of fine aggregate – 2.62 Zone of sand – II Total moisture content in 20, 10 mm – 0.3% Total moisture content in fine aggregate – 3.0% Consider use of 35% Fly Ash as replacement of cement Type of coarse aggregate – angular coarse aggregate Superplasticiser with 30% water reduction capacity at 1% dosage.	20	2	4	1.2.1



Curve 1 for expected 28 days compressive strength of 33 and < 43 N/mm².
Curve 2 for expected 28 days compressive strength of 43 and < 53 N/mm².
Curve 3 for expected 28 days compressive strength of 53 N/mm² and above

Nominal Maximum Size of Aggregate mm	Volume of Coarse Aggregate per Unit Volume of Total Aggregate for Different Zones of Fine Aggregate			
	Zone IV	Zone III	Zone II	Zone I
(2)	(3)	(4)	(5)	(6)
10	0.54	0.52	0.50	0.48
20	0.66	0.64	0.62	0.60
40	0.73	0.72	0.71	0.69

SARDAR PATEL COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)
Munshi Nagar, Andheri (W) Mumbai 400058

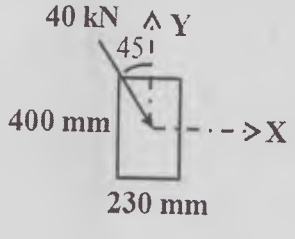
Re Examinations: December 2019

Program: B.Tech. in Civil Engineering | **Duration: 3 Hours**

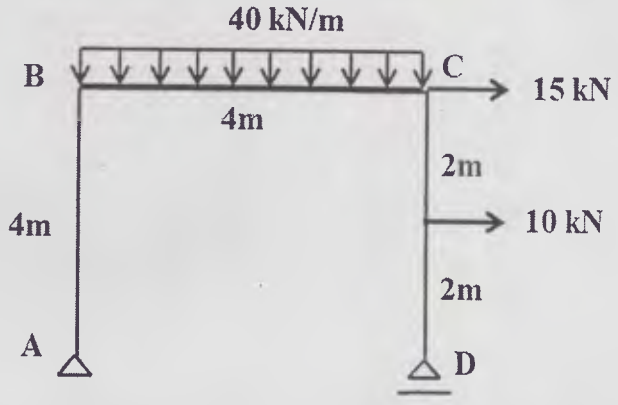
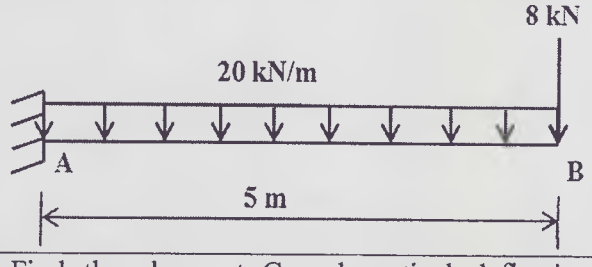
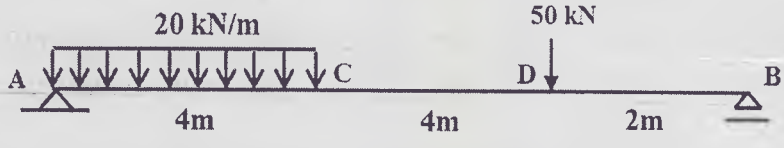
Course Code: PC-BTC402 | **Maximum Points: 100**

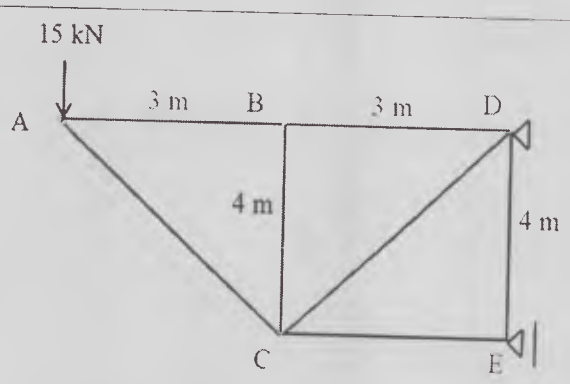
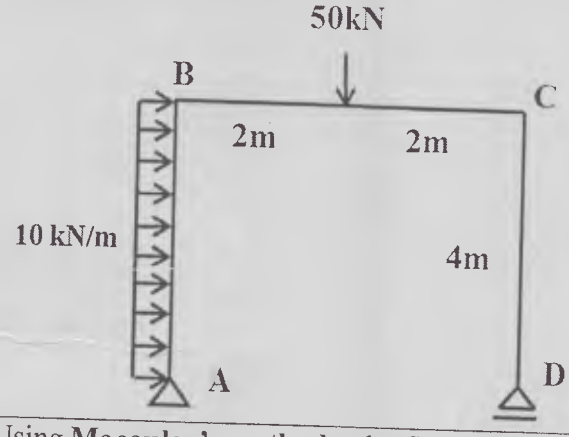
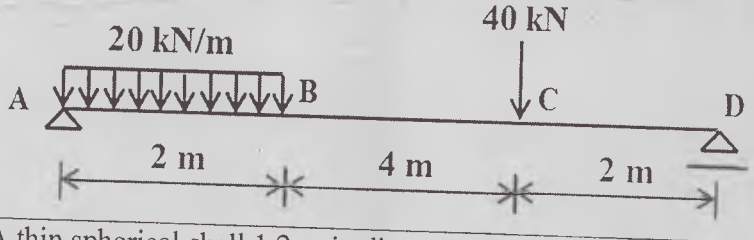
Course Name: Structural Mechanics | **Semester: IV**

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

Q.No.	Questions	Points	CO	BL	PI
Q.1(a)	A hollow circular chimney of height 20 m has hollow circular cross section with outside diameter as 3.0 m and internal diameter as 1.5 m. It is subjected to a horizontal wind pressure of 2.0 kN/m^2. The specific weight (unit weight) of masonry of chimney is 20 kN/m^3. Calculate (i) The total wind force acting on the chimney (ii) The total self weight of the chimney (iii) the maximum and minimum stresses developed at the base of the chimney.	10	1	4	1.1.1 1.3.1 2.4.1
Q.1(b)	A simply supported beam of span 4 m, is subjected to a central point load of 40 kN at an angle of 45° with Y axis as shown in figure below. The cross section of the beam is a rectangle of width 230 mm and depth 400 mm. Find the maximum bending moment and state its location. Show this moment vector in the cross section. Find the location of the neutral axis and show it in the cross section. Find the maximum and minimum bending stresses and state their location in the cross section.	10	1	4	1.1.1 1.3.1 2.4.1
	 Cross section				
Q.2(a)	Write the expression for strain energy stored in a member due to (i) Axial force (ii) Bending Moment (iii) Shear Force Explain the terms involved in each expression.	05	2	2	1.3.1

Re Examinations: December 2019

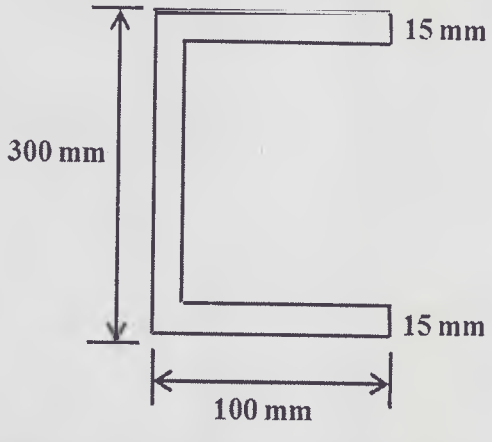
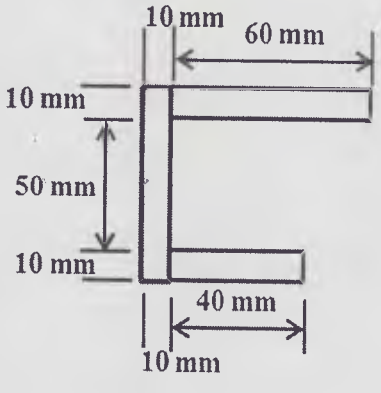
Q.2(b)	For the frame loaded as shown in figure below a) Find the support reactions b) Draw AFD, SFD & BMD	15	2	3,4	1.3.1 2.1.3
					
Q.3(a)	Find the slope and vertical deflection at B for the beam loaded as shown in figure below. **Use moment area method only.**	08	3	3,4	1.3.1 2.1.3
					
Q.3(b)	Find the slope at C and vertical deflection at D for the beam supported and loaded as shown in figure below. **Use conjugate method only.**	12	3	3,4	1.3.1 2.1.3
					
Q.4(a)	For the pin jointed frame loaded as shown in figure below, find the vertical deflection of joint A.	08	3	3,4	1.3.1 2.1.3

					
Q.4(b)	Find the horizontal deflection of point C for the rigid jointed frame supported and loaded as shown in figure below. **Use unit load method only.**	12	3	3,4	1.3.1 2.1.3
					
Q.5(a)	Using **Macaulay's method** only, find the slope and vertical deflection at B for the beam supported and loaded as shown in figure below.	12	3	3,4	1.1.1 1.3.1 2.4.1
					
Q.5(b)	A thin spherical shell 1.2 m in diameter and 15 mm wall thickness is filled with a fluid at atmospheric pressure. Find the intensity of internal pressure developed in it if 250 cm^3 more of fluid is pumped into it. Also, calculate the circumferential stress at that pressure and the increase in diameter. Take E = 200 GN/m^2, μ= 0.3.	08	4	3,4	1.1.1 1.3.1 2.4.1
Q.6(a)	A cylindrical shell 2.8 m long, which is closed at the ends has an internal diameter of 70 cm and a wall thickness of 20 mm. Calculate the circumferential and longitudinal stresses induced and also change	10	4	3,4	1.1.1 1.3.1 2.4.1

SARDAR PATEL COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)
Munshi Nagar, Andheri (W) Mumbai – 400058

Re Examinations: December 2019

	in the diameter, length and volume of the shell if it is subjected to an internal pressure of 2.5 MN/m^2. Take E = 200 GN/m^2, μ= 0.25.				
Q.6(b)	Compare the crippling loads given by Euler's and Rankine's formulae for a steel column 5.0 m long with both ends fixed. The cross section of the column is a symmetrical I section with the following dimensions. Top and bottom Flange width = 300 mm, Top and bottom Flange thickness = 30 mm, Depth of web = 200 mm, Thickness of web = 20 mm. Take E = 2x10^5 N/mm^2, f_c = 350 MPa and Rankine's constant = 1/7000.	10	4	3,4	1.1.1 1.3.1 2.4.1
Q.7(a)	Locate the shear center for the thin walled section shown in figure below. Thickness of flange and web = 15 mm.	10	4	3,4	1.1.1 1.3.1 2.4.1
					
Q.7(b)	Locate the principal axes and find the principal moments of inertia for the unsymmetrical cross section of thickness 10 mm shown in figure below.	10	1	3,4	1.1.1 1.3.1 2.4.1
					

(17)

Bharatiya Vidya Bhavan's
SARDAR PATEL COLLEGE OF ENGINEERING
(An Autonomous Institution Affiliated to University of Mumbai)

Munshi Nagar Andheri (W) Mumbai 400058

Previous Semester Examination

December 2019

Max. Marks: 100 **Duration: 3 Hrs**

Class: S.Y. B. Tech **Semester: IV**

Name of the Course: Environmental Engineering I **Program: B. Tech Civil**

Course Code: PC- BTC408

Instructions:

Question one is compulsory
Attempt any four of remaining six questions
Draw neat sketches/diagrams wherever required
Assume suitable data if necessary and state them clearly
Figure on right indicate **maximum points** for the given question, **course outcomes attained, Bloom's Level** and **Performance Indicators**

Q1	Answer the questions	(20)	CO	BL	PI
(a)	(i) Explain the need of disinfection in water treatment. (ii) Explain process of deflouridation and its requirement. (iii) Give advantages of tube settlers (iv) Explain the importance of sedimentation before filtration (v) Explain short circuiting and its importance in designing settling basins	(10)	1,2	2	1.2.1
(b)	Explain factors affecting need of water supply scheme	(05)	1,2	2	3.2.1
Q2	**Answer the following questions**	(20)			
(a)	Draw the flowsheet of conventional surface water treatment plant in detail. Explain in detail the function of each unit. The reductions of turbidity, salts and pathogens after each unit should be mentioned.	(10)	1,2,3	3,4	3.3.1
(b)	Explain per capita demand . Explain factors affecting percapita demand. Explain Fire demand in detail	(10)	1,2	3,4	5.3.1
Q3	**Answer the following questions**				
(a)	A town has a population of **6,00,000 in 2010**. The water supply scheme is to be developed for the area for the year **2040**. The past census records are provided in **table 1**. Calculate the population for which water supply system is to be designed using any two appropriate methods for newly developing city.	(05)	1-3	4-5	3.4.2

Table 1.

Year	1970	1980	1990	2000	2010
Population	3,05,000	4,00,000	4,55,000	5,10,000	6,00,000

(b)	As a city engineer which tests are to be conducted to find the potability of water. Explain any six physical, chemical and biological parameters that should be found out.	(05)	1-4	4-5	6.3.2
(c)	Explain intakes and type of intakes with their functions.	(10)	1-4	3-4	4.3.1
Q4	**Answer the following questions**				
(a)	Write short notes on Coagulation and flocculation; Ideal settling tanks	(10)	1-3	3-5	3.2.1
(c)	Explain softening process. Lime and soda were used for softening for treatment of following impurities Ca Cl_2= 220 mg/L; $Mg(HCO_3)_2$=80 mg/L; NaCl= 140 mg/L; Mg Cl_2= 350 mg/L. Compute the quantities of chemicals required for Rajkot in year 2040. Assume **soda ash and lime purity 90%. (Consider data in Q 3(a))**	(10)	1-3	3-4	3.2.2
Q5	**Answer the following questions**	(20)			
(a)	**Define SOR and WLR. Design circulat** settling tank for the population for **the year 2020 as given in Q3 (a) .**	(10)	2-3	2-3	2.2.1
(b)	Design **a paddle flocculator** for Rajkot for **2040** with following details with average water demand as 100 lpcd: **Detention time= 15 min; Average G= 70s^{-1}; Speed of paddles = 3.5 rpm K=0.25; μ =1.0087X10^{-3} Ns/m^2; ρ=998 kg/m^3 at 20°C; Ratio of L: B= 3.**	(10)	2-3	3-4	3.2.1
Q6	**Answer the following questions**				
(a)	**Design rapid sand filter for (size, underdrainage system and wash water troughs)** for the population of 5,00,000 for water demand of 150 lpcd.	(10)	3-4	3-5	4.3.2
(b)	Explain the characteristic of a good disinfectant. What factors impact the use of disinfectants. Find chlorine consumed in kg/day and chlorine dosage in mg/L for the city with population of 10,00,000 if the residual chlorine **is 0.3 mg/L** and a **chlorine demand is 0.8 mg/L and average water demand of 120 lpcd.**	(10)	3-4	2-4	3.4.1
	Answer the following questions	(20)			
(a)	**Explain with short notes** (a) Electrodialysis (b) Reverse osmosis (c) Distillation	(10)	1-4	1-2	4.2.3
(b)	**Explain** the problems related to water and water pollution in Mumbai city and give unique solution of the problems	(10)	2-3	2-3	2.2.3

Formula Sheet

$$P_n = P_o\left[1+\frac{r}{100}\right]^n$$

$$P_n = P_o + n\bar{x} + \frac{n(n+1)}{2}\bar{y}$$

$$\log_e\left[\frac{P_s - P}{P}\right] - \left[\frac{P_s - P_o}{P_o}\right] = -kP_s * t$$

Al=27
Ca=20
C=12
O=16
S=32
Cl=35.5
H=1
Na=23
Fe= 55.5

WLR=Q/B
WLR= Q/2πR
DT= V/Q
SOR= 12-20 $m^3/d/m^2$

V= 0.849 C $R^{0.63}$ $S^{0.54}$
Leq = L_{50} +{ $(L_{10} - L_{90})^2$ / 60}
NC = L_{10} - L_{90}
SOR= 24-30$m^3/d/m^2$

$P_n = (P_o + n\bar{x})$ $r = \sqrt[t]{r_1 * r_2 * r_3 * \ldots\ldots * r_n}$	Mg=24 Si=14	
SA=volume/SOR	G =300-700s^{-1} 0.5 min to 1 min	$P=\frac{1}{2} C_d \rho . A_p . v_r^3$ $C_d = 1.8\ for\ flat\ paddles$ $\rho = 998 kg/m^3$ $v_r = (1 - 0.25)v_p$
Ratio of length to diameter of lateral ≤ 60 Spacing of laterals= spacing of orifices= 150 to 300 mm Dia of perforations 5 to 12 mm (spacing 80 mm for 5 and 200 mm for 12mm) Total area of perforations≤ 0.5 Total c/s area of laterals Total area of perforation = 0.002 to 0.003 Entire filter area Area of manifold= 1.5 to 2 times laterals Rate of filtration = 300 to 500l/hr/m^2 Rate of filtration = 3000-6000l/hr/m^2 Max. demand= 1.8 Q	$v_s = \frac{1}{18}\frac{g}{v}(S_s - 1) * d^2$ Value of υ=1.002X10^{-6} m^2/sec $v_d = \sqrt{\left(\frac{8\beta}{f'}\right)(S_s - 1)dg}$ $f' = 0.025 - 0.03$ g=9.8m/s^2	Q/A; Q/ perimeter; Q/b; V/Q V= D^2 (0.011D+0.785H)
$G = \sqrt{\frac{P}{\mu * V}}$ μ=1.0087*10^{-3}Ns/m^2		$G * t = \frac{V}{Q} * \sqrt{\frac{P}{\mu V}} = \frac{\sqrt{PV/\mu}}{Q}$

ALL THE BEST

Bharatiya Vidya Bhavan's

Sardar Patel College of Engineering

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

December 2019 Examinations

15

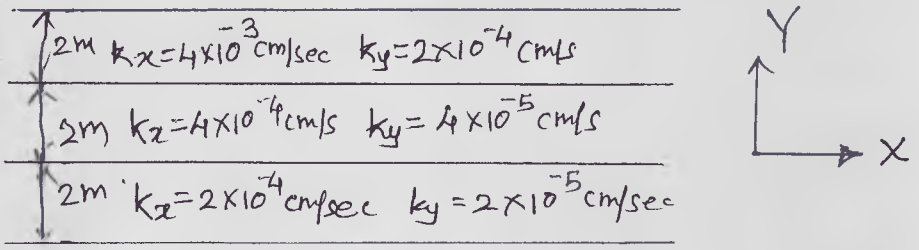
Program: Civil Engineering
Course Code: PCBTC407
Course Name: Soil Mechanics

Duration: 3hr
Maximum Points: 100
Semester: IV

Instructions:

1. Attempt any 5 questions.
2. Neat diagrams must be drawn wherever necessary.
3. Assume Suitable data if necessary and state it clearly

Q. No.		Questions	Points	CO	BL	PI
1	a	A soil deposit has a void ratio of 0.9. If the void ratio is reduced to 0.6 by compaction. Fond the percentage volume loss due to compaction.	6	CO2	BL3	1.3.1
	b	Explain how soils are classified according to IS soil classification system.	6	CO1	BL2	1.3.1
	c	Discuss the methods of determination of permeability in details.	8	CO2	BL3	1.3.1
2	a	The void ratio and specific gravity of a sample of clay are 0.73 and 2.7 respectively. If the voids ratio is 92% saturated, find the bulk density, the dry density and the water content. What would be the water content for complete saturation, the void ratio remaining the same?	8	CO1	BL2	1.3.1
	b	Discuss flow net along with their properties	6	CO1	BL1	1.3.1
	c	Discuss sand boiling phenomenon	6	CO1	BL1	1.2.1
3	a	The plastic limit of soil is 25% and plasticity index is 8%. When the soil is dried from its state at plastic limit, the volume change is 25% of its volume at plastic limit. Similarly the corresponding volume change from liquid limit to dry state is 34% of its volume at liquid limit. Determine the shrinkage limit and shrinkage ratio.	8	CO2	BL4	2.1.3
	b	State the assumptions made Boussinesq's Theory.	5	CO1	BL1	1.3.1
	c	Discuss different drainage condition for estimation of shear strength.	8	CO3	BL6	4.2.1
4	a	The horizontal and vertical permeabilities for each layer are given as in below figure Find the equivalent coefficients of permeability in the x and y directions.	8	CO2	BL4	2.1.3

		 Soil Profile				
	b	Discuss in detail purpose of soil investigation with reference to Road construction projects.	8	CO4	BL6	1.3.1
	c	A granular soil has a porosity of 42%. G=2.7. Determine the critical hydraulic gradient of the soil.	4	CO2	BL3	1.3.1
5	a	A particular soil failed under a major principal stress of 300kN/m^2 with a corresponding minor principal stress of 100kN/m^2. If for the same soil, the minor principal stress has been 200kN/m^2 determine the major principal stress for (a) Φ=30° and (b) Φ=0°	6	CO2	BL3	2.1.3
	b	Discuss the mechanistic model for consolidation.	8	CO3	BL6	2.1.3
	c	A cohesive soil yields a maximum dry density of 1.3gm/cc at OMC of 18% during a standard proctor test. If G=2.65. What is degree of saturation? What is the maximum dry density it can further compacted to?	6	CO2	BL3	2.1.3
6	a	The time to reach 60% consolidation is 30 seconds for a sample 20 mm thick, tested in the laboratory under conditions of double drainage. How many years will the corresponding layer in nature require to reach the same degree of consolidation if it is 12m thick and drained on side only?	6	CO2	BL3	1.3.1
	b	Explain Mohor's Coulomb failure Theory	8	CO3	BL3	2.1.3
	c	Distinguish between Standard Proctor Test and Modified Proctor Test.	6	CO1	BL1	1.2.1
7	a	Find the intensity of vertical pressure and horizontal shear stress at a point 4m directly below a 20kN point load acting at a horizontal ground surface. What will be vertical pressure and shear stress at a point 2m horizontally away from the axis of loading but at the same depth of 4m? Use Boussinesq's equation.	8	CO3	BL3	2.1.3
	b	Distinguish between compaction & Consolidation.	6	CO1	BL1	1.2.1
	c	Discuss Taylor's stability number. Differentiate finite and infinite slope	6	CO1	BL1	1.2.1

Bharatiya Vidya Bhavan's

SARDAR PATEL COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)

Munshi Nagar, Andheri (W) Mumbai – 400058

-Examination December 2019

Civil Engineering

Max. Points: 100 **Duration:** Three Hours

Class: S.Y. (Civil), Semester: IV **Program:** U.G. (B. Tech. Civil)

Name of the Course: Hydraulic Engineering **Course Code :**PC-BTC405

Instructions:

i. Attempt ***Any Five*** questions
ii. All questions carry equal marks
iii. Answer to each question to be started on the fresh page
iv. Assume suitable data if necessary and mention it clearly.
v. Draw neat diagrams and indicate it clearly.

Q. No.	Questions	Points	CO	BL	PI
1	(a) Derive dimensions for following quantities; (i) Stress (ii) bulk modulus (iii) Energy (iv) dynamic viscosity (v) momentum.	10	CO4	BL2	1.1.2
	(b) Derive using dimensional analysis techniques suitable parameters to present the thrust developed by propeller. Assume that the thrust 'T' depends upon the angular velocity 'ω', speed of advance 'V', diameter 'D', dynamic viscosity 'μ' mass density 'ρ' and elasticity of fluid medium represented by the speed of sound 'C' in the medium.	10	CO4	BL4	4.1.4
2	(a) Explain briefly the phenomenon of water hammer flow in pipe lines and distinguish clearly between rapid closure and slow closure of valve.	10	CO1	BL2	1.1.2
	(b)Explain(i) Three reservoir problem; and (ii) working of siphon	10	CO1	BL4	2.4.1
3	(a) Prove that; the force exerted by a jet of water on a fixed semi-circular plate in the direction of the jet when the jet strikes at the centre of the semi-circular plate is two times the force exerted by the jet on a fixed vertical plate.	10	CO2	BL4	1.2.1
	(b) Show that the efficiency of a free jet striking normally on a series of flat plates mounted on the periphery of a wheel can never exceeds 50%.	10	CO2	BL4	1.3.1
4	(a)A Pelton wheel has a mean bucket speed of 12 meter/sec with a jet of water flowing at a rate of 0.85 cum/sec. under a head of 30 meter. The bucket deflects the jet through an angle of 165^0. Assuming coefficient of velocity as 0.97, Calculate power and overall efficiency of turbine.	10	CO2	BL5	2.2.3
	(b) Explain in brief performance characteristics curves of hydraulic turbines; also explain the term specific speed of turbine.	10	CO2	BL5	2.2.3

5	(a) Write short notes on: (i) Priming of a centrifugal pump; and (ii) pumps in series and parallel	10	CO2	BL2	2.2.3
	(b) 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: (i) Discharge from a pump; and (ii) Pressure at the suction and delivery ends of the pump.	10	CO2	BL5	2.2.3
6	(a)Derive the condition for most economical trapezoidal channel section to carry maximum discharge.	10	CO3	BL2	2.1.2
	(b) Explain with neat sketches: Specific energy and specific force curve. Also state its significance in the channel flow analysis.	10	CO3	BL2	2.1.2
7	(a)Explain: (i) Venturiflume; and (ii) Broad crested weir.	10	CO3	BL2	2.1.2
	(b) A wide rectangular channel of width 1.5 meter carries a discharge of 1.25 cum/sec at a depth of 0.18 meter. Calculate; (i) The specific energy (ii) alternate depth (iii) Froude numbers at alternate depth.	10	CO3	BL2	2.1.2

****

(4)

SARDAR PATEL COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)
Munshi Nagar, Andheri (W) Mumbai – 400058

Previous Semester Examination December 2019 Examinations

Program: Civil Engineering Duration: 3 Hour

Course Code: PC-BTC 406 Maximum Points: 100

Course Name: Transportation Engineering- I Semester: IV

Notes:

Attempt any Five Questions
Figures to the right indicate full marks.
Assume suitable data if necessary and state the same clearly

Q.No.	Questions	Points	CO	BL	PI
1	Attempt any Four **a)** State merits and demerits of various modes of transportation. **(05)**	20	1	1	
	b) Define wear in rails also explain various causes of wear inn rails **(05)**		4	1	
	c) Define ICAO, FAA and AAI **(05)**		2	1	
	d) Define cant, cant deficiency and cant excess with neat sketch and state their recommended values **(05)**		4	1	
	e) Determine the turning radius of the taxiway for a supersonic aircraft with a wheel base of 30m and tread of main gear as 6m for a design turning speed of 40 kmph. Assume friction between tyre and pavement surface as 0.13,width of taxiway pavement as 22.5 m and distance of taxiway pavement edge 6 m from gear **(05)**		3	5	
2	**a)** State the objectives of airport survey and briefly explain various types of airport survey. **(10)**	20	2	1	
	b) Discuss various characteristics of aircraft affects planning and designing of airport**(10)**		2	2	
3	**a)** Discuss step by step procedure to draw Type-I and Type-II Wind Rose diagram with figure. **(10)**	20	3	2	
	b) Design an exit taxiway which joins a runway and a main parallel taxiway. The total angle of turning is 35^0 and the turn off speed is 95 kmph. Draw a neat sketch and indicate all the design elements. **(10)**		3	5	
4	**a)** Define imaginary surfaces and briefly explain various types of imaginary surfaces with neat sketch. **(10)**	20	3	2	
	b) Explain various types of airport marking and lightening as per ICAO and FAA with neat **(10)**		3	2	
5	**a)** Briefly explain various types of sleepers with their merits and demerits **(10)**	20	4	2	

	b) Draw a left-hand turnout explain all component. **(10)**		5	4	
6	**a)** Define rail and explain various types of rails with neat sketch and merit and demerits. **(06)**	20	4	2	
	b) Draw a neat sketch on a turnout showing lead and radius as per **IRS method.** Further determine the lead and radius of the 1 in 12 turnout on a broad track with the help of the following data: heel divergence = 133 mm, crossing angle = 4° 45' 49", switch angle = 1° 8' 00", straight length between the theoretical nose of crossing and the tangent point of crossing = 1.418 m. **(08)**		5	5	
	c) Enlist various types track junction and any two in detail **(06)**		5	2	
7	**a)** A 6° MG branch line track takes off from a main line track of a 2° curvature. Due to the turnout, the maximum permissible speed on the branch line is 35 km/h. calculate the negative super elevation to be provided on the branch line track and the maximum permissible speed on the main line track. **(08)**	20	5	5	
	b) Discuss various types of rail joints with neat sketch. **(07)**		4	2	
	c) Briefly explain conning of wheel and tilting of rails **(05)**		4	1	

Bharatiya Vidya Bhavan's

Sardar Patel College of Engineering

(A Government Aided Autonomous Institute)

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

Re-Examination, December- 2019

Max. Marks: 100 Q. P. Code:

Class: S.Y.B.Tech. Semester: IV Duration: 3 hour

Name of the Course: **Surveying & Geomatics** Program: Civil

Course Code : **PC- BTC- 404**

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. 1 (solve any **five** from **a to g**)		**Points**	**CO**	**BL**	**PI**
Q1	(a) Explain the applications of GIS.	**4**	1	1	1.3.1
	(b) What do you mean by Degree of Curve?	**4**	2	1	1.3.1
	(c) Write a note on Systems of Tacheometric Measurements.	**4**	1	2	1.4.1
	(d) Discuss in brief working of Total station.	**4**	3	2	1.4.1
	(e) Explain in short stages in flight plan for photogrammetry.	**4**	2	1	1.3.2
	(f) How will you measure constants of a Tacheometer?	**4**	1	1	1.3.1
	(g) Explain with neat sketch Reverse curve?	**4**	2	2	1.4.1
Q2	**(a)** From the following details, calculate the chainages of junction points and point of tangency for a combined curve. (i) Deflection angle of 75^0 (ii) Maximum speed of vehicle 80 km/hr, (iii) The radius of the circular curve is 300 m. (iv) chainage of the point of intersection is 1185m, (Assume suitable values for the rate of change of radial acceleration)	**10**	1	2	2.3.2
	(b) Derive an expression for horizontal distance and elevation using fixed hair method when staff kept vertical.	**10**	3	1	1.4.1
Q3	**a)** An downgrade -2.5 % meet with an upgrade of +3.0 %. Determine the reduced levels of the various stations on the vertical curve using any suitable method of your choice. Assume length of curve 200 m; the chainage and elevation of the point of grade separation are 2250 m and 180.00 m, respectively, (consider peg interval of 20m).	**10**	2	2	2.3.2
	b) Explain the procedure for setting out simple curve by Two Theodolite method.	**10**	2	1	1.4.1

Q4	**(a)** A ground area 40 km X 25 km is to be covered by aerial surveying. Calculate the number of photograph required from the following data. Size of photograph-230mm X 230 mm Scale (R.F.) = 1:25,000 Longitudinal overlap – 60%, side lap – 30 %.	**10**	3	3	2.3.2
	(b) Explain with neat sketch types of transition curve.	**06**	1	1	1.3.1
	(c) Draw neat sketch of compound curve and label the various elements with their interrelationship.	**04**	2	2	2.3.1
Q5	**(a)** Prepare data required for setting out curve using one chain and Theodolite method from following details: Radius of curve: 350 m, Normal Chord: 30 m, Chainage of point of intersection: 1560 m; Deflection angle 80^0.	**10**	1	2	2.1.2
	(b) How would you measure Elevation of a point using Total station?	**05**	2	1	1.3.1
	(c) How G.P.S. helps to determine the location of a place.	**05**	1	1	1.4.1
Q6	**(a)** What are the sources of error in Tacheometry?	**05**	3	1	1.4.1
	(b) How will you determine elevation of an object using relief displacement?	**05**	1	1	1.4.1
	(c) Following readings were taken by a tacheometer from a station. The staff was kept vertical, Multiplying constant = 100 and additive constant = zero. Find the horizontal distance from P to Q, and RL of Q?	**10**	2	2	2.3.2

Inst St^n.	Staff St^n.	Staff Reading			Vertical angle	Remarks
		Top	Central	Bottom		
P (HI is 1.20m)	B.M.	1.100	1.153	2.060	-6^0 00'	RL of BM 976.00 m Staff held vertical
	Q	0.982	1.085	1.188	$+8^0$ 00'	

Q7	(a) There are two stations P and Q at elevations of 245 m and 870 M respectively. The distance of Q from P is 135 km . If the elevation of a peak N at a distance of 44 KM from P is 282 m, determine whether Q is visible from P or not. If not, what would be the height of scaffolding required at Q So that Q becomes visible from P?	**10**	3	2	2.3.2
	(b) Write a note on Digital Theodolite.	**04**	2	1	2.3.1
	(c) Explain the basic process of remote sensing.	**06**	1	1	1.4.1

(L)

SARDAR PATEL COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)
Munshi Nagar, Andheri (W) Mumbai – 400058

END SEMESTER RE-EXAMINATION

JANUARY 2020

Program: S.Y. B.Tech (Civil Engineering) | **Duration: 3 hours**

Course Code: PCC – BTC 307 | **Maximum Points: 100**

Course Name: Building Materials and Construction | **Semester: IV**

Instructions:

1. **Question 1 is COMPULSORY**
2. **Attempt ANY FOUR out of remaining six questions**
3. **Start each question on a new page.**
4. **Assume suitable data, if required, and state it clearly.**
5. **Answers should be accompanied with neat sketches, wherever possible.**

Q.No.	Questions	Points	CO	BL	PI
1	Answer (5 marks each): a. Different types of staircases and their use b. Different types of stones used in construction with their uses and subtypes c. Materials used for doors and windows with their advantages and limitations d. Different types of concrete used for construction and their use	20	CO1	L1	6.3.:
2	Compare coursed and uncoursed rubble masonry w.r.t. definition, formation of joints, size of stones used, types, application and limitations. Explain the role and requirement of each material required for construction of stone masonry.	20	CO1,3	L1,2	6.3.:
3a	With neat sketches, explain different types of arches adopted for architectural and structural benefits. State their uses, advantages and limitations.	20	CO1,4	L1,2	6.3.:
3b	Draw plan and elevation of one and half brick thick English bond and Flemish bond masonry	10	CO1,2,4	L1	6.3.:
4a	Draw a neat sketch showing different parts of a Beam and slab formwork.	10	CO3,4	L1,2	6.3.:

END SEMESTER RE-EXAMINATION

JANUARY 2020

5a	State different types of shallow foundations. With neat sketch, explain the use and limitations of each type of shallow foundation.	**10**	**CO1,2,4**	**L1,2**	**6.3.**
5b	State the basic requirements for a deep foundation. Draw a neat sketch and explain: 1. End bearing piles 2. Friction piles	**10**	**CO1,2,4**	**L1,2**	**6.3.**
6a	Draw a neat labelled sketch of king post roof truss. Compare it with queen post roof truss.	**10**	**CO1,4**	**L1,2**	**6.3.**
6b	State the factors affecting material selection for plastering. Explain internal and external plastering.	**10**	**CO1,3**	**L1**	**6.3.**
7a	Write note on a. Cement types and their uses b. Types of paints and their uses	**10**	**CO1,3**	**L2,3**	**6.4.**
7b	The inside dimension of a staircase in a residential building are 3m x 5m. Floor to floor height is 4m. The waist slab is 12cm thick. Design a two quarter turn staircase. Draw the plan and section of the staircase.	**10**	**CO1,4**	**L3,4**	**6.4.**

(1)

SARDAR PATEL COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)
Munshi Nagar, Andheri (W) Mumbai – 400058

END SEMESTER RE-EXAMINATION

JANUARY 2020

Program: S.Y. B.Tech (Civil Engineering) | **Duration: 3 hours**

Course Code: PCC – BTC 307 | **Maximum Points: 100**

Course Name: Building Materials and Construction | **Semester: IV**

Instructions:

1. **Question 1 is COMPULSORY**
2. **Attempt ANY FOUR out of remaining six questions**
3. **Start each question on a new page.**
4. **Assume suitable data, if required, and state it clearly.**
5. **Answers should be accompanied with neat sketches, wherever possible.**

Q.No.	Questions	Points	CO	BL	PI
1	Answer (5 marks each): a. Different types of staircases and their use b. Different types of stones used in construction with their uses and subtypes c. Materials used for doors and windows with their advantages and limitations d. Different types of concrete used for construction and their use	20	CO1	L1	6.3.1
2	Compare coursed and uncoursed rubble masonry w.r.t. definition, formation of joints, size of stones used, types, application and limitations. Explain the role and requirement of each material required for construction of stone masonry.	20	CO1,3	L1,2	6.3.1
3a	With neat sketches, explain different types of arches adopted for architectural and structural benefits. State their uses, advantages and limitations.	20	CO1,4	L1,2	6.3.1
3b	Draw plan and elevation of one and half brick thick English bond and Flemish bond masonry	10	CO1,2,4	L1	6.3.1
4a	Draw a neat sketch showing different parts of a Beam and slab formwork.	10	CO3,4	L1,2	6.3.1

END SEMESTER RE-EXAMINATION

JANUARY 2020

5a	State different types of shallow foundations. With neat sketch, explain the use and limitations of each type of shallow foundation.	**10**	**CO1,2,4**	**L1,2**	**6.3.**
5b	State the basic requirements for a deep foundation. Draw a neat sketch and explain: 1. End bearing piles 2. Friction piles	**10**	**CO1,2,4**	**L1,2**	**6.3.**
6a	Draw a neat labelled sketch of king post roof truss. Compare it with queen post roof truss.	**10**	**CO1,4**	**L1,2**	**6.3.**
6b	State the factors affecting material selection for plastering. Explain internal and external plastering.	**10**	**CO1,3**	**L1**	**6.3.**
7a	Write note on a. Cement types and their uses b. Types of paints and their uses	**10**	**CO1,3**	**L2,3**	**6.4.**
7b	The inside dimension of a staircase in a residential building are 3m x 5m. Floor to floor height is 4m. The waist slab is 12cm thick. Design a two quarter turn staircase. Draw the plan and section of the staircase.	**10**	**CO1,4**	**L3,4**	**6.4.**