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Bharatiya Vidya Bhavan's

SARDAR PATEL COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)

Munshi Nagar, Andheri (W) Mumbai 400058

Odd Semester Re-Examination January 2020

Program: Civil Engineering **Duration: 3 hours**

Course Code: PEC – BTC – 726 **Maximum Points: 100**

Course Name: Traffic Engineering and Control **Semester: - VII**

Q.No.	Questions	Points	CO	BL	PI
Q.1					
a	Define spot speed study. Discuss different methods available for conducting spot speed study.	10	1	1	
b	Spot speed study were carried out at a stretch of highway. The consolidated data is given Table 1. Determine graphically the following; (i) upper speed limit and lower speed limit for mixed traffic flow regulation (ii) Design speed to be used for checking of geometric design element of highway. (iii) Model speed (iv) Mean mode median variance and standard deviation	10	2	4	
Q.2.					
a	Enlist the different methods available for conducting traffic survey for estimation of Running speed and journey speed. Discuss field procedure for conducting traffic survey by moving observer method. How will you record the data collected.	10	1	4	
b	Data collected from the speed and delay study by floating car method on the stretch of urban road of length 3.5 km running north to south is given in Table 2. Determine (i) Traffic flow in each direction (ii) Running speed in each direction (iii) Journey speed in each direction.	10	2	4	
Q.3.					
a.	List the different methods of traffic Volume study. Also, Discuss manual method of conducting traffic volume study.	10	1	2	
b.	The speed and concentration of vehicle in a traffic stream were observed and following data were recorded are shown	10	2	3	

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(Government Aided Autonomous Institute)

Munshi Nagar, Andheri (W) Mumbai – 400058

Odd Semester Re-Examination January 2020

	in Table 3. Find the regression equation using least cost method for (i) Determining speed from concentration (ii) Determining concentration from speed				
Q.4.					
a.	Discuss PCU. Also, tabulate PCU of different vehicles on Rural Roads (use IRC guideline)	10	1	2	
b.	What do you meant by Trip Generation. Discuss Home Based and Non home based Trip with an Example	10	1	1	
Q.5.					
a	The Trip pattern in three zones during O-D study is shown in O-D matrix (Table 4). Determine future trip generated by (i) Uniform Growth Factor Method and (ii) Average Factor Method.	10	2	3	
b	The 30 minute traffic count on cross road 1 and 2 during peak hour are observed as 280 vehicles per lane and 250 vehicles per lane respectively approaching the intersection. In the direction of heavy traffic flow, if the Amber time required is 3 second and 2 second for two roads based on approach speed. Design a signals by trial circle method. Also, draw a Phase diagram and tabulate the results. (Assume headway of 3 second during green phase)	10	1	3	
Q.6.					
a.	Derive the expression for estimation of traffic flow, running speed and journey speed for moving observer method of traffic survey.	10	1	2	
b.	Discuss the importance of Traffic Engineering	05	1	2	
c.	Discuss Probability distribution curve	05	1	2	
Q.7.	write short notes on (any four) (i) Null Hypothesis and Alternate Hypothesis (ii) z – Test and Student – t Test (iii) One Tail and Two Tail Test. (iv) Origin – Destination Study (v) Vehicle Occupancy Survey	20	2	2	

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(Government Aided Autonomous Institute)

Munshi Nagar, Andheri (W) Mumbai 400058

Odd Semester Re-Examination January 2020

Table 1

Speed range	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Frequency	12	18	68	90	203	255	120	42	30	10

Table 2.

Trip No.	Direction of trip	Journey time	delay	No. of Vehicles from opp. direction	Vehicles Overtaking test car	Vehicles Overtaken by test car
1	N-S	6.32	1.4	268	4	7
2	S-N	7.14	1.5	186	5	3
3	N-S	6.50	1.5	280	5	3
4	S-N	7.40	2.0	200	2	1
5	N-S	6.10	1.1	250	3	5
6	S-N	8.00	2.2	170	2	2
7	N-S	6.28	1.4	290	2	5
8	S-N	7.30	1.4	160	3	2

Table 3.

Concentration Vech/km	5	10	15	20	25	30	35	40	45	50
Speed Km/hr.	72	68	61	52	47	39	32	27	20	13

Table 4.

O/D	1	2	3
1	60	90	180
2	90	30	260
3	180	260	30

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SARDAR PATEL COLLEGE OF ENGINEERING

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

Re-Examinations (January 2020)
Civil Engineering

Program: UG Civil Engineering **Duration: 3 hour**
Course Code:PC-BTC-703 **Maximum Points: 100**
Course Name: Water Resources EngineeringSemester: VII

Instructions:

1. Attempt ***Any Five*** questions
2. All questions carry equal marks
3. Answer to each question to be started on the fresh page
4. Assume suitable data if necessary and mention it clearly.
5. Draw neat diagrams.

o.	Questions	Points	CO	BL	PI
1	(a) Explain hydrological cycle and water budget equation.	10	3	2	1.2.1
	(b) Explain various methods of irrigation with neat sketches.	10	3	2	1.2.1
2	(a) An irrigation canal has gross commanded area of 90,000 hectares, out of which 88% is culturable irrigable. The intensity of irrigation for Kharif season is 30% and for Rabi season 60%. Find the discharge required at the head of the canal if the duty at its head is 850 hectares/cumec for Kharif season and 1750 hectares/cumec for Rabi season.	10	1	5	1.2.1
	(b) Explain the methods of calculating average annual rainfall over a catchment.	10	2	5	1.3.1
3	(a)Explain factors affecting runoff and methods of runoff estimation.	10	2	1	2.1.2
	(b) Explain unit hydrograph theory.	10	2	5	2.3.1
4	(a) Explain reservoir routing techniques.	10	2	5	5.1.2
	(b) Explain well hydraulics and define the terms: Permeability, Transmissibility, Confined aquifer and Unconfined aquifer.	10	4	1	1.2.1
5	(a) Discuss factors governing choice and site selection of dams and reservoirs.	10	4	4	1.3.1
	(b) Explain in brief; (i) Stability requirements of gravity dam (ii) Causes of failures of earthen dams.	10	4	4	7.1.2
6	(a) Check stability of a gravity dam 90 m high for the following details, top width = 8m, free board = 4 m, u/s slope = 1:10 and for lower 60 m height, Base width = 72m, Tail water depth = 7m, the uplift pressure is considered to act over 70 % of area of section. Neglect earthquake forces and consider only reservoir full condition. Also indicate the	12	4	4	7.2.2

	value of various kinds of stresses that are developed at heel and toe. Take density of concrete = 24 kN/m^3, coefficient of friction = 0.7 and shear strength = 1400 kN/m3.				
	(b) What is water logging? Why canal lining is necessary? Give causes of water logging and its remedial measures.	08	4	5	4.1.2
7	(a) State different types of spillways and point out suitability and salient features of each type.	10	4	3	7.1.2
	(b) Design an irrigation channel to carry 55 cumecs, by Kennedy's method. Take m = 1, B/D = 2.50, Manning's n = 0.0225 and side slopes 1V: 0.50H.	10	4	3	5.1.2

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

Odd Semester Re-Examination January 2020

Program: Civil Engineering | **Duration: 3 hours**

Course Code: PEC – BTC - 726 | **Maximum Points: 100**

Course Name: Traffic Engineering and Control | **Semester: - VII**

Q.No.	Questions	Points	CO	BL	PI
Q.1					
a	Define spot speed study. Discuss different methods available for conducting spot speed study.	10	1	1	
b	Spot speed study were carried out at a stretch of highway. The consolidated data is given Table 1. Determine graphically the following; (i) upper speed limit and lower speed limit for mixed traffic flow regulation (ii) Design speed to be used for checking of geometric design element of highway. (iii) Model speed (iv) Mean mode median variance and standard deviation	10	2	4	
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b	Data collected from the speed and delay study by floating car method on the stretch of urban road of length 3.5 km running north to south is given in Table 2. Determine (i) Traffic flow in each direction (ii) Running speed in each direction (iii) Journey speed in each direction.	10	2	4	
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Odd Semester Re-Examination January 2020

	in Table 3. Find the regression equation using least cost method for (i) Determining speed from concentration (ii) Determining concentration from speed.				
Q.4.					
a.	Discuss PCU. Also, tabulate PCU of different vehicles on Rural Roads (use IRC guideline)	10	1	2	
b.	What do you meant by Trip Generation. Discuss Home Based and Non home based Trip with an Example.	10	1	1	
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Odd Semester Re-Examination January 2020

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Munshi Nagar, Andheri (W) Mumbai – 400058

Re-exam – Jan 2020 Examinations

Program: Civil Engineering **Duration:3 hrs**

Course Code: PC-BTC701 **Maximum Points: 100**

Course Name: Limit State Method for Reinforced Concrete Structures

Semester: VII

Notes:

1) Question No. 1 is compulsory. Attempt any four from remaining questions.
2) Draw reinforcement details wherever necessary.
3) Use of IS 456:2000 is permitted.

Q.No.		Questions	Points	CO	BL	PI
Q1	a)	What do you mean by Limit State.State and explain the assumptions made in LIMIT State of collapse(Flexure)	05	1	2	2.3.2
	b)	Derive design stress block parameters for singly RC sections for LSM of design subjected to flexure.	05	1	1,2	1.2.1, 1.3.1
	c)	Explain differences between working stress method and limit state method.	05	1	2	1.2.1, 1.3.1
	d)	What are the functions served by longitudinal and transverse reinforcement in case of columns.	05	1	2	1.2.1, 1.3.1
Q2	a)	A RCC beam reinforced on tension side is 350mm wide with an effective depth of 5500mm.It is reinforced with 5bars of 25mm diameter .Calculate moment of resistance .Use M 30 and Fe 500.	05	1	3	2.1.3
	b)	Design RC beam of size 300x500 mm and span 5m subjected to service udl of 60kN/m and torsional moment of 80 kN-m.Use M-30 and Fe 415	15	1,2	6	2.4.1
Q3	a)	An isolated TEE beam section having an effective depth of 750mm ,effective flange width of 1350mm ,rib width of 350mm ,slab depth of 100mm comprises of 8 bars of 25mm diameter. Calculate moment of resistance of beam. Use M-30and Fe-415.	10	1	3	2.3.1
	b)	Design one way slab panel of balcony of RCC residential building having dimensions 2.7mx6 m.Give appropriate checks. Use M30 and Fe 415.	10	1,2	6	2.4.1
Q4	a)	When is it required to design a doubly reinforced beam?	04	1	2	1.3.1

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SARDAR PATEL COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)

Munshi Nagar, Andheri (W) Mumbai – 400058

Re-exam – Jan 2020 Examinations

	b)	Design a RC slab panel of a terrace of a residential building. The size of panel is 5mx 5m.Assume live load of 3kN/m2 soil filling of 200mm (density of soil=18Kn/m3) ,Draw bottom reinforcement plan and section along long span. Assume all sides simply supported. Give appropriate checks. Use M30 and Fe 415	16	1,2	6	2.1.3
Q5	a)	Draw Pu-Mu curve for column of given proportions. Explain the curve in detail.	10	1	2,3	4.1
	b)	Design short helically reinforced column to resist service load of 1700kN.Use M30 and Fe500.Draw reinforcement details	10	1,2	6	3.1
Q6	a)	A rectangular column of dimension 300mmx500mm is subjected to axial load of 1250kN.Design isolated rectangular footing for column assuming SBC as 250kN/m2.Use M30 and Fe 415.	15	1,2	6	3.1.6
	b)	Write a short note on various types of footing under various conditions showing sketches.	05	1	2	1 .1
Q7	a)	A rectangular beam 30mm x500mm effective depth is reinforced with 6 bars of 20mm dia in tension zone .The beam is subjected to udl of 85kN/m over span of 6m.Design shear reinforcement if two bars are bent up at 45° near end of each support. Use M30 and Fe 500	10	1,2	6	3.1 6
	b)	Determine ultimate load carrying capacity of column (300 x500)mm subjected to uniaxial bending reinforced with 4 bars of 25mm dia(each in one corner).Take xu /D= 1.Assume fsc=0.87fy and fc=0.446fck.Use M30 and Fe 415.Also find eccentricity of the load.	10	1,2	4	2.4.1

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SARDAR PATEL COLLEGE OF ENGINEERING

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Munshi Nagar, Andheri (W) Mumbai 400058

End Semester Re-Examination

January 2020

Program: B.Tech – Civil Engineering
Duration: 03 hour

Course Code: BTC702
Maximum Points: 100

Course Name: Construction Engineering
Semester: VII

Notes:

1. **Q.1 is compulsory.**
2. **Attempt any four out of remaining six questions.**
3. **Assume suitable data if required and state it in the answer sheet.**
4. **Answer each question on a new sheet or page.**
5. **Figures to the right indicate full marks assigned to the question**

Q.No.	Answer the following questions	Points	CO	BL	PI
1.	a) Enlist construction equipment and methods used for construction of highways and road. b) Explain the use of drilling equipment in tunneling. c) Explain 'Useful life of an equipment'. d) Enlist different types of equipment for handling or moving materials on a construction site	20	1,2,3	1	5.4.1
2.a	Enlist the types of boring machines used for construction of tunnels. Explain the working of Earth boring machine in detail with a neat sketch (longitudinal section of EBM).	10	1	1	5.4.1
2.b	Classify Cranes on the basis of broad construction features. Explain the application of each types and its method of operating.	10	1	2	5.5.1
3.a	Suggest a suitable ground improvement technique for the construction highway embankment on an 8km section having black cotton soil upto 8m deep below ground level. Justify the method you have suggested. Explain the technique w.r.t. design, equipment needed, and procedure of work, benefits and limitations.	12	1,3	3	5.5.2, 5.6.1
3.b	Explain 'rotary drilling' in hard rock. Enlist the blasting materials adopted popularly on civil projects.	08	1,3	2	5.4.1
4.a	Discuss in detail the Metro rail work carried out in Mumbai by MMRDA w.r.t. the type of infrastructure,	14	1,2,3	3	5.5.2, 5.6.2

4.b	Explain the procedure of vacuum concreting with a proper sketch and state the precautions to be taken during this method of construction.	06	1	2	5.4.1
5.a	Explain the importance of 'Balancing or Matching of Equipment'. Cycle time of power shovel of 2cum capacity is 30 sec. Truck of 6cum and 10cum are available at rate of Rs.1800 and Rs.2200 per day respectively for 12 hours. The cycle time of 8cum truck is 12 min. and 10cum truck is 16min. How will you balance the operation of shovel and truck with least idle time and minimum cost.	10	1	3	5.4.2
5.b	Compare Jaw crusher and Cone crusher w.r.t. working, type and size of input (stone), output size, production capacity, benefits and limitations. Draw a neat sketch of the crushers.	10	1	3	5.5.1
6.a	Enlist different types of pile driving hammers and pile driving methods. Suggest a suitable pile driving hammer for piling in given soil conditions - 0-3m made ground, 3m-15m medium dense to loose clay. The groundwater table was encountered at about 1.5m. Justify your suggestion technically.	10	1	3	5.4.2
6.b	Determine hourly owning and operating cost of a machine from the data given below: a) Purchase cost – Rs. 35 Lacs b) Useful life – 10 years c) Investment cost – 18% of average investment d) Actual working – 3200 hours per year e) Salvage value – Rs. 3.5 Lacs f) Engine – 50 hp (diesel) g) Operating factor – 0.68 h) Maint. & Repairs cost – same as depreciation cost i) Lubricant cost – 22% of fuel cost j) Operator's salary – Rs.10000 per month	10	1	3	5.5.1
7.a	Define Shotcreting. Explain in detail the wet process of shotcreting with its benefits and limitations.	08	1	1,2	5.4.1
7.b	Explain the New Australian Tunneling Method (NATM) w.r.t. its specification, procedure or operation, benefits and limitations.	12	1,2	1,2	5.4.1

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SARDAR PATEL COLLEGE OF ENGINEERING

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Munshi Nagar, Andheri (W) Mumbai – 400058

ReExam

ODD SEM – Jan 2020

Program: BTech Civil Engg | **Duration: 3 Hours**

Course Code: BTC 704 | **Maximum Points: 100**

Course Name: Environmental Engineering II | **Semester: VII**

- **Attempt any five questions out of seven**
- **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**

Q.No.	Questions	Points	CO	BL	PI
Q 1(a)	Convert a) 50 ppm of SO_2 at 1.5 atm to mg/m^3 b) 5% HC at 2 atm to mg/m^3 c) 80 µg/m^3 to ppm at 1 atm	10	1	2	1.2.1
Q1 (b)	Enlist various air pollution control methods. Explain any 3 of them in detail with sketches	10	1	1	2.2.1
Q2	In Mumbai in Bhayander area, the population of 80,000 (water supply rate is 120 lpcd). The drainage area of this area is 70 hectares and run off coefficient is 0.7 on an average. The time of concentration is 30 min, find max runoff using intensity of rainfall as I= {900/(t+60)}. Design the sewer line giving checks. The characterization of the wastewater indicates high sulphates and chlorides in the sewage. Explain which material should be chosen as the sewer material and criteria for selection of sewer material and what can be the possible problems that can occur due to high sulphates and chlorides. Explain 3 sewer appurtenances likely to be used for this sewer line with sketches	20	2-3	4-5	3.4.1
Q3	A river named Yamuna flows in Delhi and tends to receive untreated sewage from the town. Explain the natural methods available for purification along with the zones in river. Explain factors impacting purification Derive equation for 1st stage BOD. The dilution water (CONTROL) has initial DO of 8.0 mg/L and the diluted sample from Yamuna has DO 7.0 mg/L. The dilution for BOD sample is 2%. After 5 days at 20°C DO in diluted sample falls to 2 mg/L and that of Control is 7.5mg/L. Find BOD_5 of sample at 20°C. The K_{10} value is 0.1/days.	(20)	2-3	4-5	3.2.1

	Find the BOD of same sample at 40oC at the end of 2 days. θ= 1.056				
Q4 (a)	A design engineer needs to design a wastewater treatment plant for a sewage generating from population of 1,00,000 for Bhayander. The domestic wastewater to be treated has initial BOD of 220mg/L and S.S. concentration of 250 mg/L. Find the BOD loading and Suspended solids loading considering water supply rate as 180 lpcd. Illustrate the basic flowsheet of wastewater treatment plant that can be proposed with function of each unit and expected reduction in BOD. Will the efficiency of the plant be as required If the treated wastewater is to be reused as process wastewater in industry, list the additional units required.	(10)	4	5-6	5.5.2
Q4 (b)	Explain with short notes (1) Stabilization pond (2) Rotating biological contactor(3) Extended aeration	(10)	2-3	3	2.1.1
Q5 (a)	In a treatment plant in Bhayandar trickling filter is used as the secondary treatment. As a consultant do you think it is better option to opt for trickling filter rather activated sludge process. State advantages and disadvantages Determine the size (dia and depth) and numbers of high rate trickling filter to be provided for the following data. (i) Sewage flow = 6.5 MLD (ii) Recirculation ratio = 1.5 (iii) BOD5 of raw sewage = 300 mg/lit (iv) BOD5 removal in PST = 30% (v) Final effluent BOD5 desired = 35 mg/lit Also calculate hydraulic loading and organic loading.	(10)	2-4	4-5	5.1.2
Q 5 (b)	In an alternative treatment plant in Bhayandar activated sludge treatment is provided as biological treatment. Explain the activated sludge process to the workers at the plant in written format and list out the problems associated with it to them. Design a continuous flow completely mixed activated sludge process with following data. Sewage flow 6000 m^3/d; Influent BOD =200mg/L; Effluent BOD= 15 mg/L; Effluent SS 20; MLSS= 3500mg/L; MLVSS/MLSS=0.8; Return sludge concentration as SS= 15000mg/L; Y=0.7; kd=0.05d-1; θc=10days. Compute oxygen requirement also. Give all checks	(10)	2-4	4-5	5.1.1

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ReExam

ODD SEM – Jan 2020

Q6 (a)	A hostel is provided near Mumbai and has population of 280 residential graduates. Design septic tank with water demand of 200 lpcd. Design trenches (no and size) considering percolation rate as 20 min per cm	(10)	2-3	4-5	4.3.1
Q6 (b)	For Andheri region design a conventional digester for mixed primary and activated sludge from 20,000 m^3/d Data given is Raw effluent SS= 250 mg/L SS removal efficiency = 60% SS concentration in primary sludge = 25 kg/m^3 Excess activated sludge = 3000 kg/day SS concentration in activated sludge = 10 kg/m^3 VM in Mixed sludge = 60%	(10)	2-3	4-5	5.2.1
Q 7	Write short notes on a) Salient features of Water Act b) Self cleansing velocity c) Testing of Sewers d) Laying of Sewers	(20)	1-4	1-2	2.2.1

Formula Sheet :

$V_S = \frac{\rho_w g (S_s-1) d^2}{18\mu}$

Or $V_S = \frac{g (S_s-1) d^2}{18\upsilon}$

Or $V_S = 418(S_s-1)d^2(T+10)/60$

$V_c = 3$ To $4.5 \sqrt{(g\, d\, (S_s - 1))}$

$v_c = \sqrt{\frac{8\beta g(S_s-1)d}{f}}$ $E_2 = \frac{100}{1+\frac{0.4432}{1-E_1}\sqrt{\frac{w_1}{VF}}}$

$\cos\frac{\theta}{2} = \left(1 - \frac{2d}{D}\right)$

$I=a/t^n$; $I=a/(t+b)$

$Y=0.5\sqrt{B}$

$R=A/P$

$Q=A.V$

$\frac{W_s}{S_s} = \frac{W_f}{S_f} + \frac{W_w}{S_w}$

$V_s = [0.707(S_s-1)d^{1.6}\upsilon^{-0.6}]^{0.714}$

$\eta = 1-\left(1+\frac{n(v_s)}{Q/A}\right)^{\frac{1}{n}}$ $q = \frac{Q}{A}$

$BHP = (w.Q.H)/(75.\eta_p.\eta_m)$

$\frac{Qr}{Q} = \frac{x_t}{\left(\frac{10^6}{svi} - x_t\right)}$

$Q_{max} = \left(1+\frac{14}{4+P^{0.5}}\right)Q_{av}$ $F = \frac{1+R}{(1+R/10)^2}$ $Q_w = \frac{VX}{\theta_c X_r}$

$\frac{1}{\theta_c} = \frac{Q}{V}(1+r-r\frac{Xr}{X})$ $U = \frac{Q*(So-S)}{V*X}$ $T = \frac{La}{20}1$

$A=0.00622.q/V_t$; $h_L=0.0729(V^2-v^2)$ $v=Q/W*d$ $\frac{W_s}{S_s} = \frac{W_f}{S_f} + \frac{W_w}{S_w}$

$Q = C.I.A / 360$

$I = 760 / (t + 10)$ $V = \frac{1}{n} * R^{\frac{2}{3}} * S^{\frac{1}{2}}$

$I = 1\,020 / (t + 10)$

$V = 0.849 C_H R^{0.63} S^{0.54}$ $\frac{F}{M} = \frac{S}{\theta * X}$ $S_R = 100(1 - 0.605\, t^{-37})$

$t_0 = \frac{d^2(0.011d+0.785H)}{Q}$ $U = \left(\frac{F}{M}\right)*\left(\frac{E}{100}\right)$ $N_0 = \frac{3.65n\sqrt{Q}}{H^{4/3}}$

$E = \left(\frac{S_o - S}{S_o}\right)*100$ $PE = \frac{BOD\ load\ from\ industry\ \left[\frac{kg}{day}\right]}{0.054\ \left[\frac{kg}{inhab \cdot day}\right]}$

$E_1 = \frac{100}{1+0.4432\sqrt{\frac{w_1}{VF}}}$ $L_t = L_o(10^{-kt})$ x=xa+xe+xi

$BOD5 = (DO_{1i} - DO_{5i}) * dilutionfactor - (DO_{1b} - DO_{5b})$

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Conc ($\mu g/m^3$)=$\frac{ppm*MW*1000}{22.4}$

$\theta_c = \frac{V*x}{Q_w x_w + Q_e x_e}$

$h_f = flv^2/(2gD)$

$V_{sl} = \frac{W_s}{\gamma_w S_{sl} P_s}$

$U = \frac{Q*(So-S)}{V*X}$

O_2 (g/d) = $\frac{Q(S_o - S)}{f}$ - 1.42 $Q_w X_r$

$\theta_c = \frac{V.x}{(Q+Q_r)x - Q_r x_r}$

$V = \frac{YQ(S_o - S)\theta_c}{x(1+k_d)\theta_c}$

$\theta_s = \frac{V_s}{Q}$

$\frac{f}{m} = \frac{So*Q}{V*X} = \frac{So}{\theta*X}$

$y_t = L_o(1-10^{-kt})$

Q= 130/Vt (lpd/m^2)

$$Volume = \left[Vf - \frac{2}{3}\left[V_f - V_d\right]\right]T_1 + V_d T_2$$

$$Volume = \frac{1}{2}\left[V_f + V_d\right]T_1 + V_d T_2$$

Parameters

4-8 hrs	n=0.1/8.1/4.1/2,1	1.8-3m; 1 to 4 $m^3/d/m^2$; 0.08-0.32kg/m^3/d
50 – 150 ml/gm	ML= 90 m MW= 30 m L:W= 1.5:1 to 7.5:1 L:D= 5:1 to 25:1 D= 3 to 50 m 7.5-10% D= 2.5 or 3.5	0.9-2.5m; 10-40$m^3/m^2/d$; 0.32-1 kg/m^3/d 0.6-1.6kg/d/m^2 6-35 m 1.6-6.4 kg/d/m^2 1 in 6 to 1 in 10 10-20 days 1.2 to 2 m 30- 40 days 4.5 to 6 m and maximum 9m 0.9 m^3
0.7-1.2 m/s	125m^3/d/m 185m^3/d/m	0.1 to 0.15per capita with dry solid loading of 80 to 120 kg/m^2/year 0.2 0.175 -0.2 m^2/c/yr area or 60-120 kg/m^2/yr
0.2-0.4/day	25-35 $m^3/m^2/d$; 50-60$m^3/m^2/d$	$Q\max = \frac{5Q_{av}}{P^{0.2}}$ $Q_{max} = \left(1 + \frac{14}{4+P^{0.5}}\right)Q_{av}$
5-15 days	15-35 $m^3/m^2/d$; 40-50$m^3/m^2/d$	$Q = 10^4 A*I*\frac{Ri}{1000*3600}$
0.3-0.6kg/m^3/d	25-50%	12 to 25 min/cm

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(Government Aided Autonomous Institute)

Munshi Nagar, Andheri (W) Mumbai – 400058

RE EXAMINATION –JAN-2020

(L)

Program: Civil Engg. **Duration:3 hrs.**

Course Code: PEC-BTC-718 **Maximum Points: 100**

Course Name: Risk & Value management

Semester: VII

Notes:

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.

Q.No.	Questions	Points	CO	BL	PI
Q.1	Solve any Four 1) Break Point Analysis 2) Types of Risk in Organization. 3) Characteristics of Value management. 4) Risk Exposure & Appetite 5) Factors impacting energy consumptions in building	20	1-3	3	2.1.3
Q.2 A.	Define: Risk Management. Also explain various steps involved in risk management plan.	12	1	2	2.1.3
Q.2.B	According to ISO 27001, "Residual risk is the risk remaining after risk treatment". Criticize above statement along with its relation to residual risk management.	06	1	5	2.1.3
Q.3.A	Write a short note on Audit Risk.	04	2	2	2.1.3
Q.3.B	A) What do you understand by Break even analysis? Explain with its components. a) Find BEP if VC & SP per unit are 15 & 20 rupees respectively and fixed expenses rupees 54000. b) What should be the selling price per unit, if the break-even point should be brought down to 6,000 units? B) Explain how the organization control risk in actual practice.	08	2	2	1.3.1

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RE EXAMINATION –JAN-2020

<table>
<tr><td>Q.3.C</td><td>Explain any eight sources of risks with suitable examples.</td><td>08</td><td>1</td><td>2</td><td>1.3.1</td></tr>
<tr><td>Q.4.A.</td><td>Define Discount cash flow techniques
Based on tabulated information which project should be selected for satisfying minimum required rate of return,
<table><tr><td></td><td>Project P</td><td>Project Q</td></tr><tr><td>Investments (Rs.)</td><td>40000/-</td><td>58000/-</td></tr><tr><td>Expected life (in Years)</td><td>04</td><td>05</td></tr><tr><td>Net earnings Year wise</td><td></td><td></td></tr><tr><td>1st</td><td>6000</td><td>7200</td></tr><tr><td>2nd</td><td>3500</td><td>6200</td></tr><tr><td>3rd</td><td>4500</td><td>3300</td></tr><tr><td>4th</td><td>2000</td><td>1200</td></tr><tr><td>5th</td><td>1590</td><td>3000</td></tr><tr><td></td><td></td><td></td></tr></table></td><td>06</td><td>3</td><td>5</td><td>2.1.3</td></tr>
<tr><td>Q.4.B</td><td>Explain the concept of Value Engineering &Job Plan & also explain its phases.</td><td>06</td><td>3</td><td>5</td><td>2.1.3</td></tr>
<tr><td>Q.4.C</td><td>Explain the importance of value management & its phases.
Also explain following terms
1) Esteem Value 3) Exchange value
4) Cost Value 5) Use Value</td><td>08</td><td>2</td><td>2</td><td>2.1.3</td></tr>
<tr><td>Q.5 A.</td><td>An investment company has to decide among the following options to invest Rs. 10 Crores.
1. Financing a mall which would have full-fledged entertainment as well as shopping experiences. This venture has high risk and could result in either a major loss or substantial gain within a year. The company estimates that with probability 0.4, it will lose all of the money. However, with probability 0.6, it will make a profit of Rs. 5 Crores.
2. The company can invest in the housing complex being built up in the city. Within a year, these would generate a profit of Rs. 2 Crores or loss of Rs. 1 Crore with</td><td>10</td><td>1</td><td>V</td><td>2.1.3</td></tr>
</table>

	the probabilities 0.7 & 0.3 respectively. 3. The company can invest in some fixed deposits that have a current yield of 9% per annum. 4. The company can also invest same amount in some mutual funds which could fetch dividend of 30% with probability 0.6 or may not fetch any dividend with probability 0.4. a) Construct a decision tree to help the company decide how to invest its money? Which Investment would maximize profit?				
Q.5.B	(A) Departmental store desires to determine the optimal daily order size for a toy box. The store purchased toy box from bulk market at the rate of Rs. 160 per kg & sells at the rate of Rs. 200 per kg in retail market. If the good environment creates, order size more than demand, the store can sell excess quantity at rate of Rs.150 per kg via online market; otherwise the opportunity cost for store is Rs. 30 per kg for unsellable portion of demand Based on feedback analysis given by customers, store came to know that the demand varies from 100 kg to 500 kg in steps of 100 kg. The possible values of the order size 150 kg to 600 kg in steps of 150 kg. Determine the optimal option by Laplace , Minimax , savage minimax regret & Hurwicz Criterion methods.	10	3	5	1.3.1
Q.6.A	(B) Explain following terms 1) Risk Appetite 2) Risk Exposure Find out total risk exposure for the following events i) Failure to complete project on time (probability is 40% for two weeks delay & penalty is 2 Lakh/week) ii) New regulatory poke (probability is 20% & redesigning cost is 1 Lakh) iii) Material shortage for vendor (probability is 40% & additional expense is 1Lakh)	06	3	2	2.1.3

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RE EXAMINATION –JAN-2020

Q.6.B	When is the best time to perform a VE analysis? Before the Record of Decision, after the Record of Decision, during PE or final design?	06	3	2	2.1.3
Q.6.C	Explain Failure mode effect analysis & its types. Also explain various steps of above analysis along with examples.	08	2	5	2.1.3
Q.7.A.	Briefly explain various types of costs involved in life cycle costing of project.	10	3	2	1.3.1
Q.7.B	Explain the concept of Life Cycle Costing along with its advantages & disadvantages. Also explain approaches towards life cycle costing.	10	3	5	2.1.3

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SARDAR PATEL COLLEGE OF ENGINEERING

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

Re-Examinations (January 2020)
Civil Engineering

Program: UG Civil Engineering **Duration: 3 hour**
Course Code:PC-BTC-703 **Maximum Points: 100**
Course Name: Water Resources EngineeringSemester: VII

Instructions:

1. Attempt *Any Five* questions
2. All questions carry equal marks
3. Answer to each question to be started on the fresh page
4. Assume suitable data if necessary and mention it clearly.
5. Draw neat diagrams.

o.	Questions	Points	CO	BL	PI
1	(a) Explain hydrological cycle and water budget equation.	10	3	2	1.2.1
	(b) Explain various methods of irrigation with neat sketches.	10	3	2	1.2.1
2	(a) An irrigation canal has gross commanded area of 90,000 hectares, out of which 88% is culturable irrigable. The intensity of irrigation for Kharif season is 30% and for Rabi season 60%. Find the discharge required at the head of the canal if the duty at its head is 850 hectares/cumec for Kharif season and 1750 hectares/cumec for Rabi season.	10	1	5	1.2.1
	(b) Explain the methods of calculating average annual rainfall over a catchment.	10	2	5	1.3.1
3	(a)Explain factors affecting runoff and methods of runoff estimation.	10	2	1	2.1.2
	(b) Explain unit hydrograph theory.	10	2	5	2.3.1
	(a) Explain reservoir routing techniques.	10	2	5	5.1.2
	(b) Explain well hydraulics and define the terms: Permeability, Transmissibility, Confined aquifer and Unconfined aquifer.	10	4	1	1.2.1
5	(a) Discuss factors governing choice and site selection of dams and reservoirs.	10	4	4	1.3.1
	(b) Explain in brief; (i) Stability requirements of gravity dam (ii) Causes of failures of earthen dams.	10	4	4	7.1.2
6	(a) Check stability of a gravity dam 90 m high for the following details, top width = 8m, free board = 4 m, u/s slope = 1:10 and for lower 60 m height, Base width = 72m, Tail water depth = 7m, the uplift pressure is considered to act over 70 % of area of section. Neglect earthquake forces and consider only reservoir full condition. Also indicate the	12	4	4	7.2.2

	value of various kinds of stresses that are developed at heel and toe. Take density of concrete = 24 kN/m^3, coefficient of friction = 0.7 and shear strength = 1400 kN/m3.				
	(b) What is water logging? Why canal lining is necessary? Give causes of water logging and its remedial measures.	08	4	5	4.1.2
7	(a) State different types of spillways and point out suitability and salient features of each type.	10	4	3	7.1.2
	(b) Design an irrigation channel to carry 55 cumecs, by Kennedy's method. Take m = 1, B/D = 2.50, Manning's n = 0.0225 and side slopes 1V: 0.50H.	10	4	3	5.1.2

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SARDAR PATEL COLLEGE OF ENGINEERING

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ReExam

ODD SEM – Jan 2020

Program: BTech Civil Engg | **Duration: 3 Hours**

Course Code: BTC 704 | **Maximum Points: 100**

Course Name: Environmental Engineering II | **Semester: VII**

- **Attempt any five questions out of seven**
- **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**

Q.No.	Questions	Points	CO	BL	PI
Q 1(a)	Convert a) 50 ppm of SO_2 at 1.5 atm to mg/m^3 b) 5% HC at 2 atm to mg/m^3 c) 80 µg/m^3 to ppm at 1 atm	10	1	2	1.2.1
Q1 (b)	Enlist various air pollution control methods. Explain any 3 of them in detail with sketches	10	1	1	2.2.1
Q2	In Mumbai in Bhayander area, the population of 80,000 (water supply rate is 120 lpcd). The drainage area of this area is 70 hectares and run off coefficient is 0.7 on an average. The time of concentration is 30 min, find max runoff using intensity of rainfall as I= {900/(t+60)}. Design the sewer line giving checks. The characterization of the wastewater indicates high sulphates and chlorides in the sewage. Explain which material should be chosen as the sewer material and criteria for selection of sewer material and what can be the possible problems that can occur due to high sulphates and chlorides. Explain 3 sewer appurtenances likely to be used for this sewer line with sketches	20	2-3	4-5	3.4.1
Q3	A river named Yamuna flows in Delhi and tends to receive untreated sewage from the town. Explain the natural methods available for purification along with the zones in river. Explain factors impacting purification Derive equation for 1st stage BOD. The dilution water (CONTROL) has initial DO of 8.0 mg/L and the diluted sample from Yamuna has DO 7.0 mg/L. The dilution for BOD sample is 2%. After 5 days at 20°C DO in diluted sample falls to 2 mg/L and that of Control is 7.5mg/L. Find BOD_5 of sample at 20°C. The K_{10} value is 0.1/days.	(20)	2-3	4-5	3.2.1

	Find the BOD of same sample at 40oC at the end of 2 days. θ= 1.056				
Q4 (a)	A design engineer needs to design a wastewater treatment plant for a sewage generating from population of 1,00,000 for Bhayander. The domestic wastewater to be treated has initial BOD of 220mg/L and S.S. concentration of 250 mg/L. Find the BOD loading and Suspended solids loading considering water supply rate as 180 lpcd. Illustrate the basic flowsheet of wastewater treatment plant that can be proposed with function of each unit and expected reduction in BOD. Will the efficiency of the plant be as required If the treated wastewater is to be reused as process wastewater in industry, list the additional units required.	(10)	4	5-6	5.5.2
Q4 (b)	Explain with short notes (1) Stabilization pond (2) Rotating biological contactor(3) Extended aeration	(10)	2-3	3	2.1.1
Q5 (a)	In a treatment plant in Bhayandar trickling filter is used as the secondary treatment. As a consultant do you think it is better option to opt for trickling filter rather activated sludge process. State advantages and disadvantages Determine the size (dia and depth) and numbers of high rate trickling filter to be provided for the following data. (i) Sewage flow = 6.5 MLD (ii) Recirculation ratio = 1.5 (iii) BOD5 of raw sewage = 300 mg/lit (iv) BOD5 removal in PST = 30% (v) Final effluent BOD5 desired = 35 mg/lit Also calculate hydraulic loading and organic loading.	(10)	2-4	4-5	5.1.2
Q 5 (b)	In an alternative treatment plant in Bhayandar activated sludge treatment is provided as biological treatment. Explain the activated sludge process to the workers at the plant in written format and list out the problems associated with it to them. Design a continuous flow completely mixed activated sludge process with following data. Sewage flow 6000 m^3/d; Influent BOD =200mg/L; Effluent BOD= 15 mg/L; Effluent SS 20; MLSS= 3500mg/L; MLVSS/MLSS=0.8; Return sludge concentration as SS= 15000mg/L; Y=0.7; kd=0.05d-1; θc=10days. Compute oxygen requirement also. Give all checks	(10)	2-4	4-5	5.1.1

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ODD SEM – Jan 2020

Q6 (a)	A hostel is provided near Mumbai and has population of 280 residential graduates. Design septic tank with water demand of 200 lpcd. Design trenches (no and size) considering percolation rate as 20 min per cm	(10)	2-3	4-5	4.3.1
Q6 (b)	For Andheri region design a conventional digester for mixed primary and activated sludge from 20,000 m^3/d Data given is Raw effluent SS= 250 mg/L SS removal efficiency = 60% SS concentration in primary sludge = 25 kg/m^3 Excess activated sludge = 3000 kg/day SS concentration in activated sludge = 10 kg/m^3 VM in Mixed sludge = 60%	(10)	2-3	4-5	5.2.1
Q 7	Write short notes on a) Salient features of Water Act b) Self cleansing velocity c) Testing of Sewers d) Laying of Sewers	(20)	1-4	1-2	2.2.1

Formula Sheet :

$V_s = \frac{\rho_w g (S_s-1) d^2}{18\mu}$

Or $V_s = \frac{g (S_s-1) d^2}{18\upsilon}$

Or $V_s = 418(S_s-1)d^2(T-10)/60$

$V_c = 3$ To $4.5 \sqrt{(g\,d\,(S_s-1))}$

$v_c = \sqrt{\frac{8\beta g(S_s-1)d}{f}}$ $E_2 = \frac{100}{1+\frac{0.4432}{1-E_1}\sqrt{\frac{w_2}{VF}}}$

$\cos\frac{\theta}{2} = \left(1-\frac{2d}{D}\right)$

$I=a/t^n$; $I=a/(t+b)$

$Y=0.5\sqrt{B}$

$R=A/P$

$Q=A.V$

$\frac{W_s}{S_s} = \frac{W_f}{S_f} + \frac{W_w}{S_w}$

$V_s = [0.707(S_s-1)d^{1.6}\upsilon^{-0.6}]^{0.714}$

$\eta = 1-\left(1+\frac{n(v_s)}{Q/A}\right)^{-\frac{1}{n}}$ $q = \frac{Q}{A}$

$BHP = (w.Q.H)/(75.\eta_p.\eta_m)$

$\frac{Qr}{Q} = \frac{x_t}{\left(\frac{10^6}{svi} - x_t\right)}$

$Q_{max} = \left(1+\frac{14}{4+P^{0.5}}\right)Q_{av}$ $F = \frac{1+R}{(1+R/10)^2}$ $Q_w = \frac{VX}{\theta_c X_r}$

$\frac{1}{\theta_c} = \frac{Q}{V}(1+r-r\frac{Xr}{X})$ $U = \frac{Q*(So-S)}{V*X}$ $T = \frac{La}{20}1$

$A=0.00622.q/V_r$; $h_L=0.0729(V^2-v^2)$ $v=Q/W*d$ $\frac{W_s}{S_s} = \frac{W_f}{S_f} + \frac{W_w}{S_w}$

$Q = C.I.A / 360$

$I = 760 / (t+10)$ $V = \frac{1}{n} * R^{\frac{2}{3}} * S^{\frac{1}{2}}$

$I = 1020 / (t+10)$

$V = 0.849 C_H R^{0.63} S^{0.54}$ $\frac{F}{M} = \frac{S}{\theta * X}$ $S_R = 100(1 - 0.605\,t^{-37})$

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$BOD5 = (DO_{is} - DO_{fs}) * dilutionfactor - (DO_{ib} - DO_{fb})$

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ODD SEM – Jan 2020

Conc ($\mu g/m^3$)=ppm*MW*1000 / 22.4

$\theta_c = \frac{V*x}{Q_w x_w + Q_e x_e}$

$h_f = flv^2/(2gD)$

$V_{sl} = \frac{W_s}{\gamma_w S_{sl} P_s}$

$U = \frac{Q*(So-S)}{V*X}$

O_2 (g/d) = $\underline{Q(S_o - S)}$ - 1.42 $Q_w X_r$

$\theta_c = \frac{V.x}{(Q+Q_r)x - Q_r x_r}$

$V = \frac{YQ(S_o - S)\theta_c}{x(1+k_d)\theta_c}$

$\theta_s = \frac{V_s}{Q}$

$\frac{f}{m} = \frac{So*Q}{V*X} = \frac{So}{\theta*X}$

$y_t = L_o(1-10^{-kt})$

Q= 130/Vt (lpd/m^2)

$Volume = \left[Vf - \frac{2}{3}\left[V_f - V_d\right]\right]T_1 + V_d T_2$

$Volume = \frac{1}{2}\left[V_f + V_d\right]T_1 + V_d T_2$

Parameters

4-8 hrs	n=0,1/8.1/4.1/2,1	1.8-3m; 1 to 4 $m^3/d/m^2$; 0.08-0.32kg/m^3/d
50 – 150 ml/gm	ML= 90 m MW= 30 m L:W= 1.5:1 to 7.5:1 L:D= 5:1 to 25:1 D= 3 to 50 m 7.5-10% D= 2.5 or 3.5	0.9-2.5m; 10-40$m^3/m^2/d$; 0.32-1 kg/m^3/d 0.6-1.6kg/d/m^2 6-35 m 1.6-6.4 kg/d/m^2 1 in 6 to 1 in 10 10-20 days 1.2 to 2 m 30- 40 days 4.5 to 6 m and maximum 9m 0.9 m^3
0.7-1.2 m/s	125m^3/d/m 185m^3/d/m	0.1 to 0.15per capita with dry solid loading of 80 to 120 kg/m^2/year 0.2 0.175 -0.2 m^2/c/yr area or 60-120 kø/m^2/yr
0.2-0.4/day	25-35 $m^3/m^2/d$; 50-60$m^3/m^2/d$	$Q\max = \frac{5Q_{av}}{P^{0.2}}$ $Q_{max} = \left(1 + \frac{14}{4+P^{0.5}}\right)Q_{av}$
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0.3-0.6kg/m^3/d	25-50%	12 to 25 min/cm

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RE EXAMINATION –JAN-2020

(L)

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Course Code: PEC-BTC-718 **Maximum Points: 100**

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<tr><td>Q.4.A.</td><td>Define Discount cash flow techniques

Based on tabulated information which project should be selected for satisfying minimum required rate of return,

<table><tr><td></td><td>Project P</td><td>Project Q</td></tr><tr><td>Investments (Rs.)</td><td>40000/-</td><td>58000/-</td></tr><tr><td>Expected life (in Years)</td><td>04</td><td>05</td></tr><tr><td>Net earnings Year wise</td><td></td><td></td></tr><tr><td>1st</td><td>6000</td><td>7200</td></tr><tr><td>2nd</td><td>3500</td><td>6200</td></tr><tr><td>3rd</td><td>4500</td><td>3300</td></tr><tr><td>4th</td><td>2000</td><td>1200</td></tr><tr><td>5th</td><td>1590</td><td>3000</td></tr><tr><td></td><td></td><td></td></tr></table></td><td>06</td><td>3</td><td>5</td><td>2.1.3</td></tr>
<tr><td>Q.4.B</td><td>Explain the concept of Value Engineering &Job Plan & also explain its phases.</td><td>06</td><td>3</td><td>5</td><td>2.1.3</td></tr>
<tr><td>Q.4.C</td><td>Explain the importance of value management & its phases.
Also explain following terms
1) Esteem Value 3) Exchange value
4) Cost Value 5) Use Value</td><td>08</td><td>2</td><td>2</td><td>2.1.3</td></tr>
<tr><td>Q.5 A.</td><td>An investment company has to decide among the following options to invest Rs. 10 Crores.

1. Financing a mall which would have full-fledged entertainment as well as shopping experiences. This venture has high risk and could result in either a major loss or substantial gain within a year. The company estimates that with probability 0.4, it will lose all of the money. However, with probability 0.6, it will make a profit of Rs. 5 Crores.
2. The company can invest in the housing complex being built up in the city. Within a year, these would generate a profit of Rs. 2 Crores or loss of Rs. 1 Crore with</td><td>10</td><td>1</td><td>V</td><td>2.1.3</td></tr>
</table>

	the probabilities 0.7 & 0.3 respectively. 3. The company can invest in some fixed deposits that have a current yield of 9% per annum. 4. The company can also invest same amount in some mutual funds which could fetch dividend of 30% with probability 0.6 or may not fetch any dividend with probability 0.4. a) Construct a decision tree to help the company decide how to invest its money? Which Investment would maximize profit?				
Q.5.B	Departmental store desires to determine the optimal daily order size for a toy box. The store purchased toy box from bulk market at the rate of Rs. 160 per kg & sells at the rate of Rs. 200 per kg in retail market. If the good environment creates, order size more than demand, the store can sell excess quantity at rate of Rs.150 per kg via online market; otherwise the opportunity cost for store is Rs. 30 per kg for unsellable portion of demand Based on feedback analysis given by customers, store came to know that the demand varies from 100 kg to 500 kg in steps of 100 kg. The possible values of the order size 150 kg to 600 kg in steps of 150 kg. Determine the optimal option by Laplace , Minimax , savage minimax regret & Hurwicz Criterion methods.	10	3	5	1.3.1
Q.6.A	Explain following terms 1) Risk Appetite 2) Risk Exposure Find out total risk exposure for the following events i) Failure to complete project on time (probability is 40% for two weeks delay & penalty is 2 Lakh/week) ii) New regulatory poke (probability is 20% & redesigning cost is 1 Lakh) iii) Material shortage for vendor (probability is 40% & additional expense is 1Lakh)	06	3	2	2.1.3

Q.6.B	When is the best time to perform a VE analysis? Before the Record of Decision, after the Record of Decision, during PE or final design?	06	3	2	2.1.3
Q.6.C	Explain Failure mode effect analysis & its types. Also explain various steps of above analysis along with examples.	08	2	5	2.1.3
Q.7.A.	Briefly explain various types of costs involved in life cycle costing of project.	10	3	2	1.3.1
Q.7.B	Explain the concept of Life Cycle Costing along with its advantages & disadvantages. Also explain approaches towards life cycle costing.	10	3	5	2.1.3

(1)

Bharatiya Vidya Bhavan's

SARDAR PATEL COLLEGE OF ENGINEERING

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

Re exam –Jan 2020 Examinations

Program: Civil Engineering | **Duration:3 hrs**

Course Code: PC-BTC503 | **Maximum Points: 100**

Course Name: Design of RCC Elements | **Semester: VII**

Notes:

1) Question No. 1 is compulsory. Attempt any four from remaining questions.
2) Draw reinforcement details wherever necessary.
3) Use of IS 456:2000 is permitted.

Q.No.		Questions	Points	CO	BL	PI
Q1	a)	What do you mean by Limit State.State and explain the assumptions made in LIMIT State of collapse(Flexure).	05	1	2	2.3.2
	b)	Derive design stress biock parameters for singly RC sections for LSM of design subjected to flexure.	05	1	1,2	1.2.1, 1.3.1
	c)	When is it required to design a doubly reinforced beam?	05	1	2	1.2.1, 1.3.1
	d)	What are the functions served by longitudinal and transverse reinforcement in case of columns.	05	1	2	1.2.1, 1.3.1
Q2	a)	RC section 250mmx650mm depth overall and reinforced with 4-25mm dia is used as simply supported beam over an effective span of 5m. Determine the maximum udl beam can carry safely.Use M 30 and Fe-415	08	1	3	2.1.3
	b)	Design RC beam of size 300x500 mm and span 5m subjected to service udl of 90kN/m and torsional moment of 40 kN-m.Use M-35 and Fe 415	12	1,2	6	2.4.1
Q3	a)	An isolated TEE beam section has an effective depth of 750mm ,effective flange width of 1200mm ,rib width of 300mm ,slab depth of 125mm .Design the beam to carry ultimate moment of 750kN-m. Use M-30and Fe-415.	10	1	3	2.3.1
	b)	Design one way slab panel of room of RCC residential building having dimensions 2.5mx 6m. Give appropriate checks. Use M3. Fe 415.Draw reinforcement details	10	1,2	6	2.4.1

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Re exam –Jan 2020 Examinations

Q4	a)	What are the functions of distribution steel in one way slab?	04	1	2	1.3.1
	b)	Design a RC slab for an interior panel of a balcony of a residential building. The size of panel is 3mx 5m.Assume live load of 2kN/m2.,Draw bottom reinforcement plan and section along long span. Give appropriate checks. Use M35 and Fe 415	16	1,2	6	2.1.3
Q5	a)	Draw Pu-Mu curve for column of given proportions. Explain the curve in detail.	10	1	2,3	1.4.1
	b)	Design short helically reinforced column to resist service load of 1500kN.Use M35 and Fe500.Draw reinforcement details	10	1,2	6	3.1.6
Q6	a)	A column of dimension 500mmx500mm is subjected to axial load of 1600kN.Design isolated footing for column assuming SBC as 225kN/m2.Use M30 and Fe 415.	15	1,2	6	3.1.6
	b)	Calculate load carrying capacity of column of size 500mmx600mm comprising of 8-25mm dia. Use M-30 and Fe-500.	05	1	2	1.3.1
Q7	a)	A rectangular beam 300mm x500mm effective depth is reinforced with 6 bars of 20mm dia in tension zone .The beam is subjected to udl of 60kN/m over span of 5m.Design shear reinforcement if 2 bars are bent up at 45° near 1 m end of each support. Use M30 and Fe 500	10	1,2	6	3.1.6
	b)	Determine ultimate load carrying capacity of column (300 x500)mm subjected to uniaxial bending reinforced with 4 bars of 20mm dia(each in one corner).Take xu /D= 0.8 D.Assume fsc=0.87fy and fc=0.446fck.Use M30 and Fe 415.Also find eccentricity of the load.	10	1,2	4	2.4.1

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(2)

Bharatiya Vidya Bhavan's

Sardar Patel College of Engineering

(A Government Aided Autonomous Institute)

Munshi Nagar, Andheri (West), Mumbai 400058.

Re- Exam

January - 2020

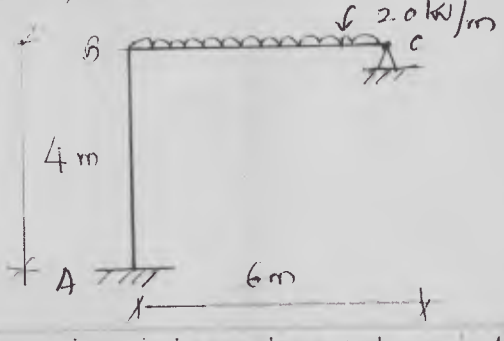
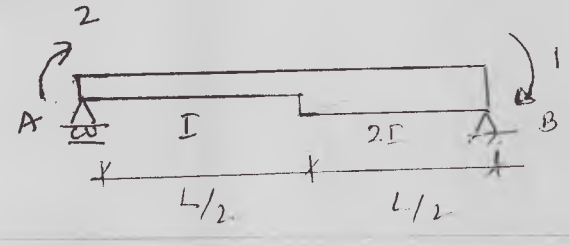
Max. Marks: 100 Duration: 3 Hours

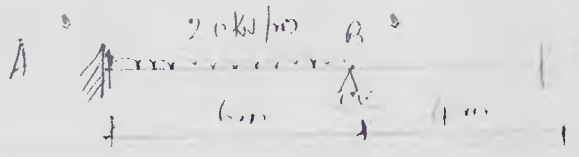
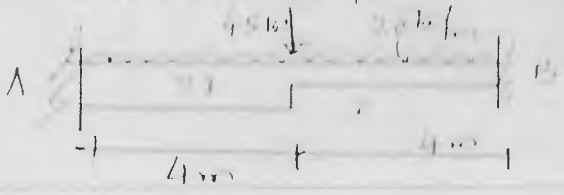
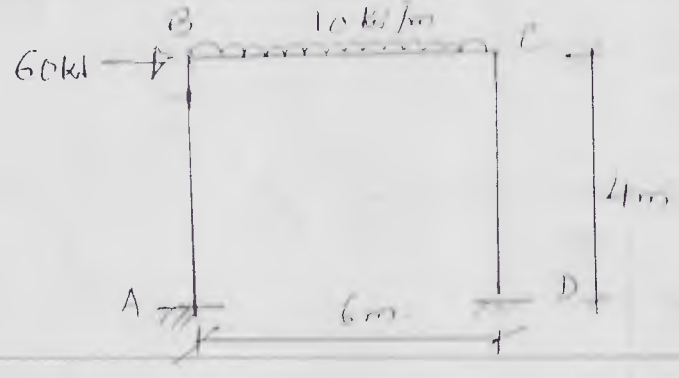
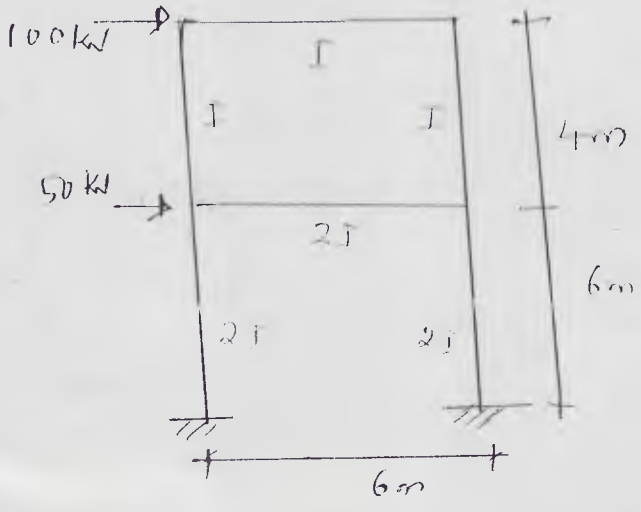
Class: B.Tech. Semester: VII Program: Civil Engineering

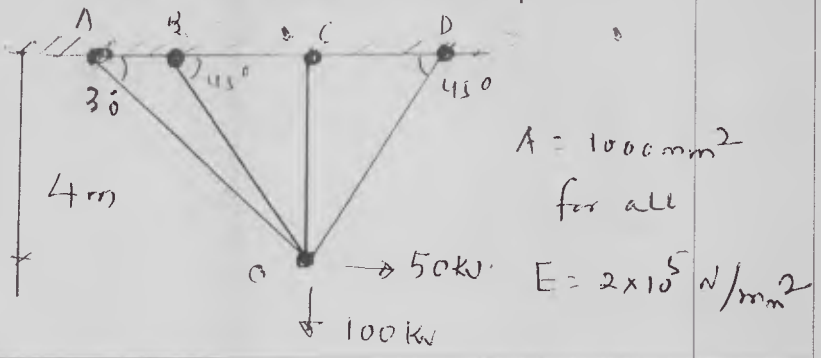
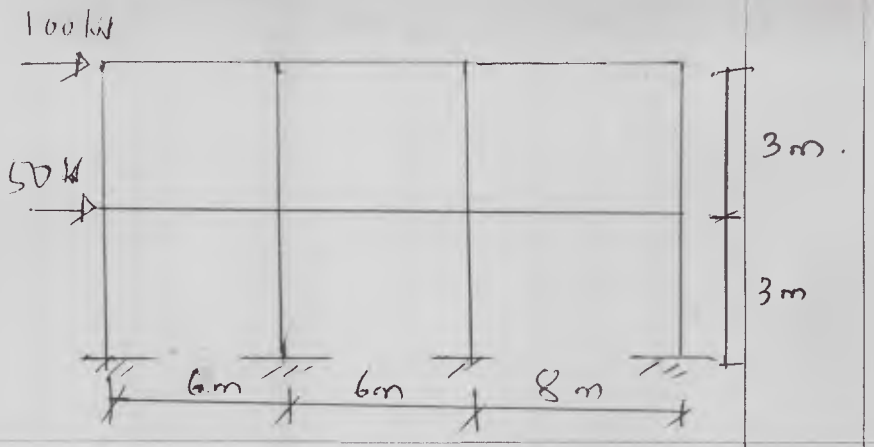
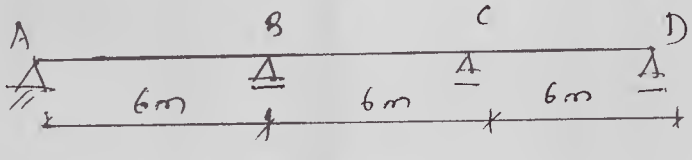
Name of the Course: Advanced Structural Analysis Course Code : PEC- BTC711

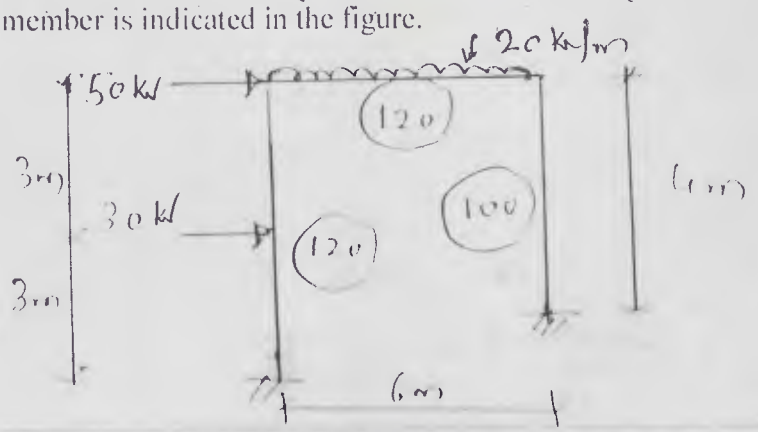
Instructions:

- 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.

Question No		Points	CO	BL	PI
Q1 (a)	Distinguish clearly the stiffness and flexibility methods of Analysis of Indeterminate Structure.	3	1,2	2	2.1.3
Q1(b)	Analyse the frame shown in figure and draw BMD and deflected shape. Note that support A rotates by 10^{-4} rad.(clockwise) EI = 2 x 10^4 KnN-m^2 	8	2	4	1.3.1, 1.4.1
Q1 (c).	For the non-prismatic beam element shown in figure calculate the stiffness coefficients K_{11} and K_{21}. Also calculate the COF from B to A 	9	2	3	2.4.1

Q2 (a)	Analyse the beam shown in figure by Matrix Stiffness Method Note that support 'B' settles down by 10 mm. $I = 10{,}000$ KN/m^2. 	10	1,4	4	
Q2 (b)	Using Column Analogy Method, analyse the beam shown in figure and draw BMD and Deflected shape 	10	2	4	2.4.1
Q3(a)	Derive the modified stiffness and carry over factor for a symmetric beam (axis of symmetry passing through center of beam) subjected to (i) symmetric loads (ii) Anti symmetric loads	4	2	6	2.3.1
Q3 (b)	Analyse the frame shown in figure by Elastic Centre Method and draw BMD, SFD and deflected shape 	16	2	4	2.4.1
Q4	Analyse the frame shown in figure by Modified Moment Distribution Method and draw SFD, BMD & deflected shape. 	20	2	4	2.4.1

Q5 (a)	Analyse pin jointed plane frame shown in figure by Matrix Stiffness Method ~~and draw BMD and deflected shape~~.  	08	1,4	4	2.4.1, 5.1.1
Q5(b)	Analyse the frame shown in figure by Portal Method and draw SFD, BMD and deflected shape  	12	2	4	2.3.2 2.1.3
Q6(a)	(i) Define ILD and state its significance in structural analysis	2	3	1	1.4.1
	(ii) State and explain Muller Breslau's Principle	2	3	1	2.4.1
Q6(b)	For the beam shown in figure, construct the ILD for: (i) Reaction at 'C' R_c (ii) Moment at 'B' M_B  Show the ordinates of ILD at 2m intervals	16	3	3	2.4.1

Q7(a)	Using plastic analysis, determine the load factor for the frame loaded as shown in figure. The Plastic Moment capacity of each member is indicated in the figure.  	16	2	3	2.4.1
Q7b)	(i) Explain the need of approximate methods of Analysis (ii) State the Limitation of Elastic Centre Method and Column Analogy Method. State also advantage of Columns Analogy Method (i.e. is for what it is more suitable)	2 2	2 2	1 1	2.4 2.3.2