Bharatiya Vidya Bhavan's
SARDAR PATEL COLLEGE OF ENGINEERING
(An Autonomous Institution Affiliated to University of Mumbai)
Munshi Nagar Andheri (W) Mumbai 400058

9/3/22

Reexam

March 2022

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

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

Class: T.Y B. Tech **Semester: V**

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

Course Code: BTC 506

Instructions:

- **Question 1 is compulsory and Attempt any four questions out of the remaining six**
- **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 following questions:**	(10)	CO	BL	PI
(a)	**Choose the right choice and give reasons/solutions for the same**		2-4	1-4	2.2.1
(A)	The average annual daily flow of a city is 200 lpcd. The maximum daily and maximum hourly flow of the city, assuming maximum daily flow and maximum hourly flow is 2 times and 3 times of annual average daily flow on any day, respectively are: i. 0.025 m^3/hr and 0.01667 m^3/hr ii. Both are 0.025 m^3/hr iii. 0.01667 m^3/hr and 0.025 m^3/hr iv. 0.0083 m^3/hr and 0.01667 m^3/hr respectively	(02)			2.1.1 1.2.2
(B)	BOD/COD ratio of a wastewater sample will usually be: i. Greater than One ii. Less than One iii. Equal to One iv. Zero	(02)			
(C)	A 100 mL water aliquot was filtered through a dry whatman glassfibre filter paper of weight 2.4 g and filtrate collected in a crucible of weight 23.50 g. After oven drying at 104 ^{0}C for 24 hr, the resulting dried weight of filter was 2.465 g, while dried weight of crucible was 25.10 g. Assuming no weight loss of filter paper and crucible during heating, what would be the Total Suspended Solids (TSS) concentration in water? i. 650mg/L ii. 3100 mg/L iii. 2350 mg/L iv. 750 mg/L	(02)			
(D)	The average flow in a municipal wastewater treatment plant is 5000 m^3/day. Determine the approximate diameter of a circular primary clarifier to remove suspended solids at average flow. Assume overflow rate of 30 m/day and a depth of 3 m. i. 5.5 m ii. 14.5 m iii. 10.4 m iv. 28 m	(02)			

(E)	What is the headloss through a bar rack with an approach velocity of 0.60 m/s and velocity through the screen of 0.94 m/s? i. 38 mm ii. 3.80 mm iii. 5.40 mm iv. 0.54 m/s	(02)			
(b)	**Explain the requirement of wastewater treatment plant and need for sewerage system (water carriage system). Deliberate what led to development of water carriage system. Analyze how water carriage system is better than dry conservancy system**	(10)	2-3	5	3.2.3
Q2	**Answer the following questions:**	(20)			
(a)	Rajouri district in J and K has a population of 6,50,000 (water supply rate is 100 lpcd; sewage conversion factor is 0.8). The drainage area of this area is 20 sq km and run off coefficient is 0.6 on an average. The time of concentration is 30 min, find max runoff using intensity of rainfall as I= {900/(t+60)}. This area has a sandy soil and a low water table (1 m depth). 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.	(10)	1-4	1-5	3.1.6 4.3.1
(b)	Explain the need of sewer appurtenances and enumerate the same with explanation of any two with sketches	(10)	3	1-2	1.3.1
Q3	**Answer the following questions:**	(20)			
(a)	A river named Tawi flows in Rajauri and tends to receive untreated sewage from the town. Explain the ways in which sewage can be used so as to not affect the river.	(05)	2	2,3	5.1.2
(b)	Derive equation for 1st stage BOD. The dilution water (CONTROL) has initial DO of 8 mg/L and the diluted sample from Tawi has DO 8 mg/L. The dilution for BOD sample is 2.5%. After 5 days at 20°C DO in diluted sample falls to 3 mg/L and that of Control is 7.3 mg/L. Find BOD_5 of sample at 20°C. The K_{10} value is 0.1/days. Find the BOD of same sample at 27°C at the end of 2 days. θ= 1.056	(10)	1-3	3-4	4.3.2
(c)	Explain relative stability and population equivalence	(05)	3	1-2	5.1.2
Q4	**Answer the following questions:**	(20)			
(a)	A design engineer needs to design a wastewater treatment plant for a sewage generating from Rajouri. The domestic wastewater to be treated has initial BOD of 210mg/L and S.S. concentration of 220 mg/L. Find the BOD loading and Suspended solids loading. 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 for construction, list the additional units required.	(10)	1-4	1-5	5.1.2 .2 3.1.6
(b)	A per capita water demand of a township in Rajauri is 180 LPCD having total population of 90000 persons. The sewage generated from this town is required to lift for 15 m of static head and 120 m distance. Consider loss of head in bends and valves of 0.3 m. Determine (a) size of the sump well, (b) horsepower required for the pump, (c) diameter of the rising main. Assume suitable data required. Assume velocity in rising main as 1m/sec. Take efficiency of pump 65% and motor as 75%.	(10)	3-4	4-5	3.1.6
Q5	**Answer any two of the following questions:**				

(a)	Explain with short notes (1) Oxidation Ditch (2) Rotating biological contactor(3) Oxidation Pond	**(10)**	**1-2**	**1**	
(b)	In a treatment plant in Rajauri 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 = 15 MLD (ii) Recirculation ratio = 2 (iii) BOD_5 of raw sewage = 210 mg/lit (iv) BOD_5 removal in PST = 35% (v) Final effluent BOD_5 desired = 30 mg/lit Also calculate hydraulic loading and organic loading.	**(10)**	**1-4**	**1-5**	**3.1.6**
(c)	In an alternative treatment plant in Rajauri activated sludge treatment is provided as biological treatment. Design a continuous flow completely mixed activated sludge process with following data. Sewage flow 6000 m^3/d; Influent BOD =210mg/L; Effluent BOD= 30 mg/L; Effluent SS 20; MLSS= 3500mg/L; MLVSS/MLSS=0.8; Return sludge concentration as SS= 15000mg/L; Y=0.7; k_d=0.05d^{-1}; θ_c=10days. Compute oxygen requirement also. Give all checks	**(10)**	**1-4**	**4-5**	**3.2.1** **3.1.6**
Q6	**Answer the following questions:**	**(20)**			
(a)	A hostel is provided near Rajauri and has population of 250 residential graduates. Design septic tank with water demand of 200 lpcd. Design trenches (no and size) considering percolation rate as 20 min per cm. Please sketch the same	**(10)**	**3-4**	**4-5**	**3.1.6**
(b)	For Rajauri, 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)**	**3-4**	**5**	**3.1.6**
Q7	**Answer <u>any four</u> the following questions:**	**(20)**			**1.3.1**
(a)	Problems in activated sludge process	**(05)**	**3-4**	**1**	
(b)	Anaerobic digestion	**(05)**	**2**	**1**	
(c)	Sludge dewatering and drying	**(05)**	**2**	**1**	
(d)	Testing of sewers	**(05)**	**2**	**1**	
(e)	Laying of sewers	**(05)**	**2**	**1**	

<u>Formula Sheet</u> :

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

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

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

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

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

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

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

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

Y=0.5$\sqrt{}$ B

R=A/P

Q=A.V

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

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

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

BHP = (w.Q.H)/(75.η_p. η_m)

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

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

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

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

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

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

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

Q = C.I.A / 360

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

I = 1 020 / (t + 10)

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

$$t_0 = \frac{d^2(0.011d + 0.785H)}{Q} \qquad U = \left(\frac{F}{M}\right)*\left(\frac{E}{100}\right) \qquad Ns = \frac{3.65n\sqrt{Q}}{H^{0.75}}$$

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

$L_t = L_o(10^{-Kt})$ $\qquad$ x=xa+xe+xi

$$E_1 = \frac{100}{1+0.4432\sqrt{\frac{w_1}{VF}}}$$

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

h_f=flv^2/(2gD)

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

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

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

O_2 (g/d) = Q(So - S) - 1.42 $Q_w X_r$

$$V = \frac{YQ(S_0 - S)\theta_c}{x(1+k_d)\theta_c} \qquad \theta_S = \frac{V_S}{Q} \qquad \frac{f}{m} = \frac{So*Q}{V*X} = \frac{So}{\theta*X}$$

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

Q= 130/√t (lpd/m^2)

12 to 25 min/cm

25-50% $\qquad$ 0.3-0.6kg/m^3/d

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; 10-40m^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; 50-60m^3/m^2/d	$Q\ \max = \frac{5Q_{av}}{P^{0.2}}$ $\qquad Q_{max} = \left(1+\frac{14}{4+P^{0.5}}\right)Q_{av}$
5-15 days	15-35 m^3/m^2/d; 40-50m^3/m^2/d	$Q = 10^4 A * I * \frac{Ri}{1000*3600}$

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Re-Examination 2021-2022

11/3/22

T.Y. B.Tech Civil Sem V

Max. Marks: 100 Duration: 03 Hours

Class: T. Y. B. Tech Civil. Semester:V

Name of the Course: OCIS Course Code : **HSM BTC 507**

Organizational Communication & Entrepreneurship Skills

Instruction: Candidates should read carefully the instructions printed on the question paper and on the cover of the Answer Book, which is for their use.

1) **Question No.1, is compulsory.**
2) **Out of remaining 05 questions attempt any 03**
3) **Answer to each new question to be started on a fresh page.**
4) **Figures in brackets on the right-hand side indicate full marks.**
5) **Please write answers to the point. Vague answers will not get marks**

<table>
<tr><th>Ques. No.</th><th></th><th>Points</th><th>CO</th><th>BL</th><th>PI</th></tr>
<tr><td>Q1. A.</td><td>The Government of India is concerned about the steady increase in the outbreak of diseases among working class. In order to work on the possible solutions, the Health minister has asked the chief Medical Officer. IMSI, Delhi, to find out the possible causes of these diseases, the problems faced and the other related factors. On the basis of the following data, as CMO, IMSI, Delhi, prepare a report to be submitted to the health Minister.
Table 1: Data showing diseases and the percentage of suffering people
<table>
<tr><th>Sr. No</th><th>Name of the Disease</th><th>Percentage of people suffering from it</th></tr>
<tr><td>1.</td><td>Diabetes</td><td>25%</td></tr>
<tr><td>2.</td><td>Blood Pressure</td><td>20%</td></tr>
<tr><td>3.</td><td>Stress</td><td>35%</td></tr>
<tr><td>4.</td><td>Asthma</td><td>5%</td></tr>
<tr><td>5.</td><td>Migraine</td><td>10%</td></tr>
<tr><td>6.</td><td>Slip Disc</td><td>5%</td></tr>
</table>
Prepare a letter report including all the contents of a report.</td><td>20</td><td>1, 2, 5,</td><td>02,03</td><td>12.2.2</td></tr>
<tr><td>Q2.A</td><td>Experience: 1 - 3 years Skills: Electrical Engineer, Mechanical engineer, Maintenance Industry: ITES/BPO Functional Area: Manufacturing/Engineering/R&D Limited vacancy Electrical Engineer, Mechanical Education : Diploma / Degree Salary : 12k to 15k { depend upon interview } Age : 18 yrs to 35 yrs. In Response to the advertisement</td><td>20</td><td>05</td><td>01,02</td><td>12.3.1</td></tr>
</table>

	Write a **job application** along with your detailed **resume**. (Invent Necessary Details) Preferred skills:- 3D Cad Modeling, AutoCAD, MSCIT, Adruino, Matlab, TEKLA, Google Sketch up, Gender:- Male & Female preferred				
Q.3.	The All India Council of Technical Education has appointed a ten-member committee to study the quality of technical education in the country and its relevance to the social needs and national requirements. In its 7th Meeting held at 4 p.m. on 25th November, 2019, at Manikchand Bhawan, Netaji Marg, New Delhi-110006 this committee transacted the following business: 1. Confirmation of minutes of the previous meeting 2. Identification of the points on which information to be sought from institutions 3. Constitution of four sub-committees for personal interaction with IIT's 4. Appointments of four research assistants for collection and organization of data 5. Any other matter with the permission of the chairman. Assuming yourself to be the secretary of the review committee write the Notice, Agenda with proper format and minutes of the above meeting	20	01	03,04	10.3.1
Q.4. A.	Case Study: Saminder, a fresh graduate, joined an Indian IT firm. On the first day in office he, wanted to be his natural self. So, he wore a pair of jeans and shirt and he walked into his office. He got to meet his boss, and the first question the latter asked him was, "Did you not find out about the dress code we follow?" Saminder was perplexed. After all, he was under the impression that IT companies had a casual work environment. He was assigned to a project and after some training; he was able to give his best. He interacted with his team mates and his clients, and was happy that he was doing a very good job. A year passed by and it was time for his performance discussion. There was shocking news in store for him at the discussion: He was rated "one of the lowest" performers in his team. He was furious and walked in his manager's cubicle. This is what Saminder's manager told him: 'you are diligent at work, but apart from the good work you do, there are some unwritten rules of the organization that you must follow. I am being very open as I want you to grow in this company. Here, people like to be addressed as 'sir' and 'madam' and not by their first names. However, you do not follow this practice. Calling people by their first names is offensive in this company'. Saminder's manager once again touched upon the issue of dress code. He said: 'you are expected to wear formals on all days except Friday. Often, I see you coming to office unshaven, shirt untucked, and wearing jazzy colors. This kind of dressing does not go well with the culture of the company. Moreover, you often come in late and work late, which disturbs the working schedule of the other team members. Here, employees are expected to come on time and	20	02	01,02	10.2.3

	leave on time.' Sarminder's manager asked him whether he remembered what happened during a visit to their office by clients, when Saminder had been asked to come in formal attire. 'You disrespected that request of ours,' the managers reminded Saminder. 'moreover, on the same occasion, in spite of telling you multiple times, you spoke in Hindi in front of your clients knowing well that they understood English only. In the same meeting, your mobile phone rang twice, to which they objected. The impression that you created among them was not good, and they refused to involve you in the project. However in spite of this, we have requested them to keep you, owing to the work you did. 'Saminder manager also reminded him that at the dinner hosted by the clients, Saminder drank so much that he lost his senses. 'You made a lot of noise while you were eating, and busy grabbing food instead of focusing on the interaction with the clients.' Saminder was also told that many of his colleagues had complained that he spoke loudly on the phone while in his cubicle. 'When you pick up your mobile phone, you do not go to a private space. This has caused a lot of problems to people around you,' the manager said. The manager said that when Saminder attended conference calls with clients, irrespective of what was being discussed, he kept the phone at a high volume. 'While talking, you are loud, and during informal, friendly conversations, your use of slang and abuses have been noticed by many. You have discussed politics and got into fights with your colleagues on many occasions.' The manager reminded Saminder that the day he joined, he had been told about the appropriate conduct expected of him. He told Saminder: 'I told you about the dress codes we follow and our work culture. Saminder, you have often been found sleeping after the lunch hour on your table. During office hours, many senior managers have noticed you with a novel in hand, which does not give the right picture about you.' Women colleagues have also complained of you sending what are app messages after office hours. You have also not refrained from criticizing management on social networking site. He added: Remember that doing well in your job is not enough. The professional space is also about how to carry yourself. Questions: 1. On what fronts did Saminder violate the etiquettes? Write your answer in points 2. How can Saminder Improve his Image in front of colleagues? Elaborate on the professional etiquettes that he should follow.				
Q.5. A	Using the **right formatting technique**, turn the following contents into a reliable, **email. Revise it so as make it effective in terms of grammar, usage, capitalization and punctuation marks** **love is sth that makes me happeee** ....u know it makes u think its ok if nothing else is going rite for u but u have	(10)	1, 2,5	4	12.4.2

	someone to live for....that's the grandee feeling v need....isn't it?.....but sometimes love make you feel it is one of the magic of god to forgot the real meaning of life.....anyways....who bothers....i am happy in love and feels grt to hv found my soulmate....idon't care abt meaning of life and all that serious issues people use their life in and keep a serious face all the time.				
Q.5. B.	State whether the following statements are true or false: 1. Email writing is informal and no grammatical rules are required to observe while composing it. 2. Email writing is quite frequently used in professional communication these days 3. The expression yours truly is an example of complimentary close in email writing 4. The expression Dear/ sir is an example of salutation 5. Since an urgent email requires immediate attention we should write the mail in all capitals 6. In order not to sound abrupt begin your email with introductory warm up sentences 7. In email jargon 'flame' refers to the mail that doesn't reach the recipient well in time. 8. While composing an email, we must choose different cases of masculine noun such as he, him and his for those persons whole gender we are unaware of. 9. No need to worry of grammar and punctuations as it is considered informal writing 10. There is no subject line required for an email.	10	3,4,	07	10.3.2
Q.6 A.	Give a detailed explanation of the evaluation Criteria in a GD.	(10)	01, 03,02,5	06	12.3.2
Q.6.B	State True or False. 1. Stage fright is quite normal 2. Good speakers do not feel nervous while giving a presentation 3. Speech anxiety can be awful 4. Knowing your audience helps control stage fear 5. Planning and practice reduces stage fear 6. Knowing your introduction and conclusion well in advance may, in fact, increase stage fright 7. Nervous speakers tend to take slow breaths 8. The more experience you gain as a public speaker, the less nervous you will feel 9. Rehearsing aloud reduces speech anxiety 10. Inexperienced speakers often try to control their nervousness and stage fright too slowly.	(10)	02,05	04	12.2.2