AIKTC/KRRC/SoET/ACKN/QUES/2017-18/ **Date:** _____

School: SoET-CBSGS **Branch:** CIVIL ENGG. **SEM:** VIII

To,
Exam Controller,
AIKTC, New Panvel.

Dear Sir/Madam,

Received with thanks the following **Semester/Unit Test-I/Unit Test-II (Reg./ATKT)** question papers from your exam cell:

Sr. No.	Subject Name	Subject Code	Format		No. of Copies
			SC	HC	
1	Design and Drawing of Reinforced Concrete Structures	CE-C801		✓	02
2	Construction Engineering	CE-C802			
3	Construction Management	CE-C803			
4	Elective II Industrial Waste treatment	CE-E804		✓	02
5	Bridge design engineering			✓	02
6					

Note: SC – Softcopy, HC - Hardcopy

(Shaheen Ansari)
Librarian, AIKTC

Paper / Subject Code: 52601 / Design & Drawing of Reinforced Concrete Structures

20/11/18

B.E- Sem-VIII - Civil- CBGS

Q.P.Code: 37773

(4 Hours) [Total Marks: 80]

1. Question **No 1** is **Compulsory.**
2. Attempt any **three** questions out of remaining questions.
3. Use of **IS CODES** is **permitted.**
4. **Assume** suitable data if required and **state** it clearly.
5. Sketches must be drawn on **DRAWING SHEET.**

Q 1 Attempt following questions.

a. State the advantages of ductility in reinforced concrete structures. **05**

b. Write a short note on different types of joints in water tanks. **05**

c. Explain the scissor joint in staircase reinforcement. (figure1) **04**

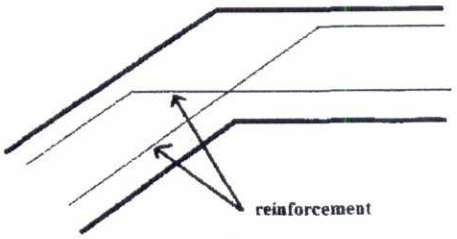


Figure 1.

d. Explain the structural behavior of cantilever and counter fort retaining wall with neat sketches. **06**

Q 2 The framing plan of a residential building is shown in Figure 2.
All external walls are 230 mm thick and internal walls are 150 mm thick.
Floor to floor height is 3.5 m. Grade of concrete is M 20 and steel is Fe 415.
All columns are 300mm ×300mm in size.

TURN OVER

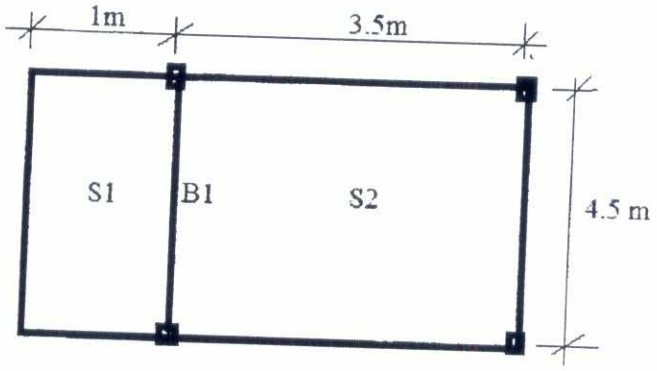


Figure 2

	Design the cantilever slab (chajja) S1	**08**
	Draw the reinforcement details of S1	**02**
	Design beam B1	**08**
	Draw the reinforcement details of beam B1	**02**
Q 3	Design a dog legged staircase having 11 risers in a flight. Take rise 150mm and tread 260 mm. Width of staircase is 1.2 m. Grade of concrete is M 20 and steel is Fe 415.	**14**
	Draw the plan showing both flight details, mid landing etc.	**02**
	Draw Reinforcement details in a flight.	**04**
Q 4	Design by approximate method a rectangular tank 6 m × 4 m in plan and 3.5 in height. Tank is resting on firm ground. Grade of concrete is M 25 and steel is Fe 415.check the design for safe stresses.	
	Design the following	**14**
	a) Side walls	
	b) Base slab	
	Draw neat sketches showing the reinforcement details	**06**
Q 5	A reinforced concrete cantilever retaining wall is supporting a backfill of height 3.5 m above ground. Take density of soil = 18 kN/m^3. Angle of	

repose =30^0. SBC of soil = 175 kN/m^3 and coefficient of friction between concrete and soil =0.35. Grade of concrete is M 20 and steel is Fe 415.

a) Design the stem and toe of wall and show all stability checks. **14**

b) Draw reinforcement details of toe and stem with curtailment of reinforcements. **06**

Q 6 a) Following figure shows the layout plan of the columns of a building. Design a raft foundation for the building. Working loads acting on columns are given below. Take net bearing capacity = 80 kN/m^3. **15**

Load on columns C1,C3,C7,C9 = 700 kN.

Load on columns C4,C6 = 900 kN.

Load on columns C2 ,C8 =800 kN.

Load on column C5= 1200 kN.

Draw a neat sketch showing reinforcement details **05**

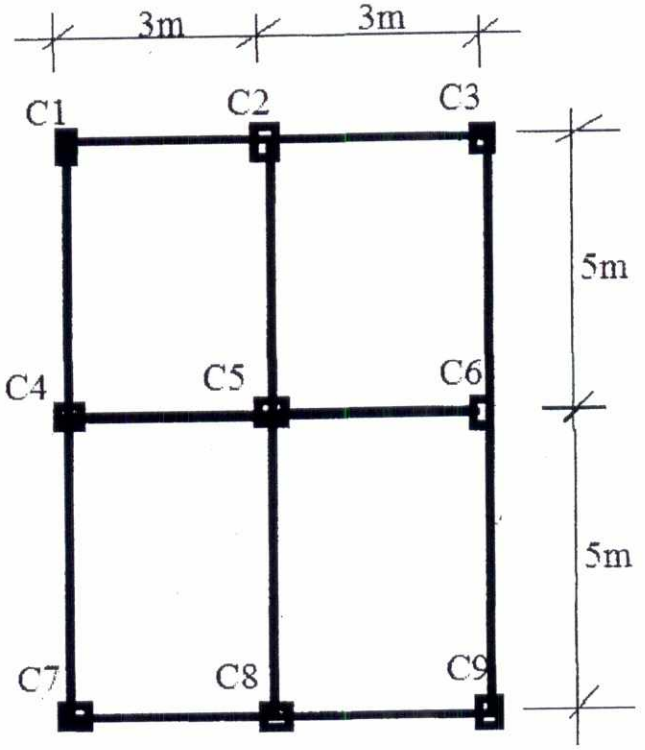


Figure 3

(1)

BE- sem-VII - CBSGS - Civil

11/12/18

Paper / Subject Code: 52618 / Elective II 15) Industrial Waste Treatment

Q.P. Code : 26302

[3 Hours] **[Marks: 80]**

N.B:
1. Question No. **1 is compulsory**.
2. **Figures** to the **right** indicate **full** marks.
3. Attempt any **three** from remaining **five** questions.
4. Assume **suitable** data wherever **required**.

1. (a) Why Industrial waste needs to be treated ? **05**
   (b) What is environmental impact assessment. How is it useful ? **05**
   (c) Explain the inplant control measures to reduce volume of the industrial waste water. **05**
   (d) What is by product recovery ? Explain with suitable example. **05**

2. (a) Explain with neat flow sheet manufacturing process of sugar from sugar industry. Write down the characteristics of the effluent. **10**
   (b) Explain the effects of industrial pollutants on river/stream. **10**

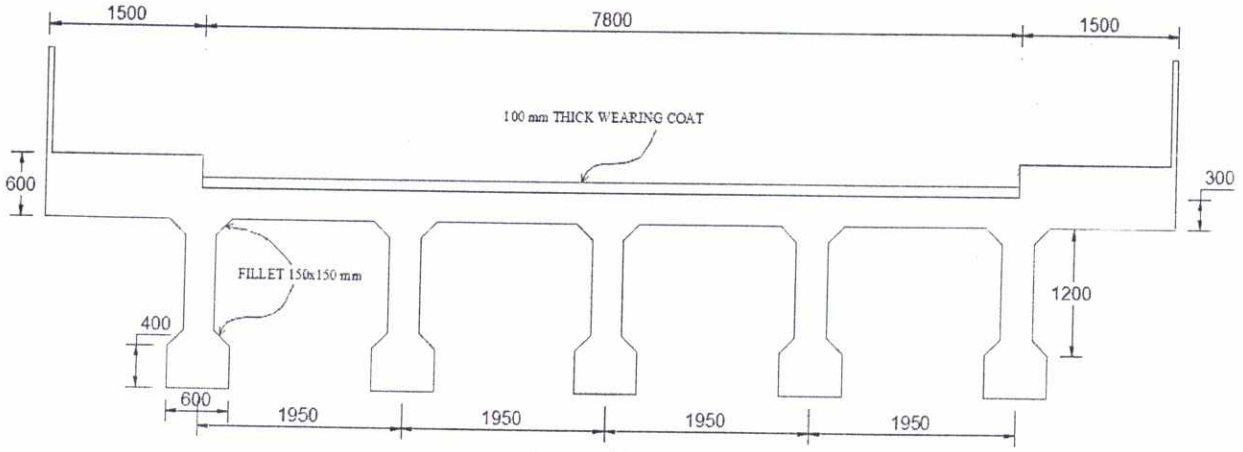
3. (a) Why equalization is required in industrial waste treatment ? How to achieve it ? **05**
   (b) Explain good house keeping. **05**
   (c) Explain with neat sketch treatment given to electroplating industry effluent. **10**

4. (a) What is neutralization ? Is it necessary for industrial waste treatment ? Justify your answer. What are the methods of neutralization ? **10**
   (b) Write down the characteristics of tannery effluent. Explain with neat sketch treatment given to the effluent. **10**

5. Write short note on (any 4) **20**
   (a) Sampling of an Industrial waste
   (b) Treatability study
   (c) Effluent standards and stream standards
   (d) UASB
   (e) Dewatering of sludge

6. (a) Write down the streeter phelps equation. Explain the significance of oxygen sag curve with neat sketch. **05**
   (b) What is Save all ? **05**
   (c) Discuss with the flow sheet treatment given to the pulp and paper industry effluent. **10**

5. Determine **design bending moment and shear force** on longitudinal girder of a 28m span bridge, due to IRC Class AA tracked vehicle and self-weight of bridge superstructure. Clear carriage width is 7.8m, footpath on either side is 1.5m and cross girders are provided at 4m c/c. Thickness of deck stab is 300mm thickness of wearing coat is 100mm. Area of cross girder is 70% of area of longitudinal girder. **[20]**

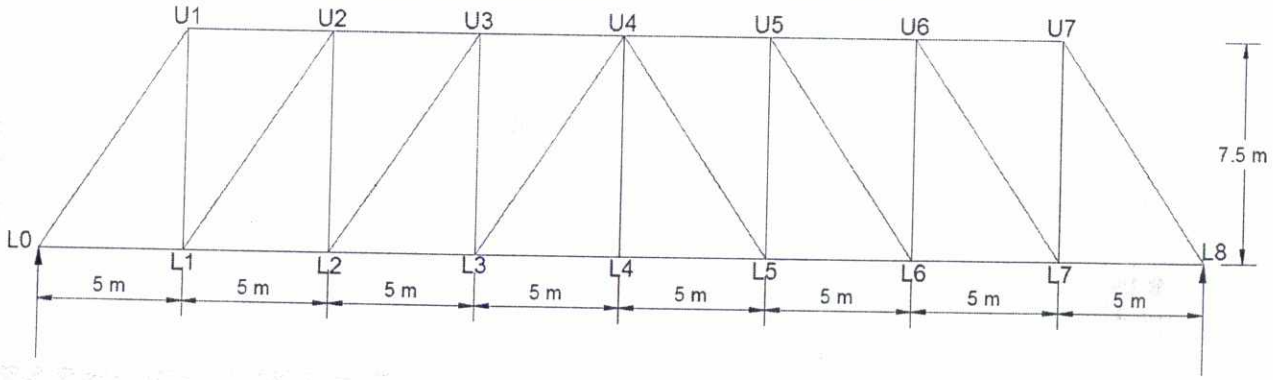


6. (a) What are different types of foundations used in bridges? How different factors influence type of foundation? **[05]**

(b) Determine **Design forces** due to **dead** and **live load** in diagonal member L_3U_4 of a lattice girder bridge of **40m** span as shown below. **[15]**

Consider self-weight of different elements per meter span per track as under:
Stringers: 3000N/m, Stock rail: 500N/m, Guard rails: 400N/m,
cross beams and bracings: 3000N/m, fasteners: 3000N/m,
PSC sleepers are spaced 400mm c/c and are of size 2.8m x 250mm x 250mm
Take self-weight of each girder (top chord, bottom chord, diagonals and vertical members): 12000N/m.
Bridge is to be designed to carry a single track Broad gauge loading-1987 as under

Span (m)	15	16	17	18	19	20	21	22	23	24	25
Loading*	1631	1695	1751	1820	1886	1964	2039	2123	2203	2280	2356



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BE-sem-VIII_CBSGS-Civil

Paper / Subject Code: 52608 / Elective II 5) Bridge Design Engineering

11/12/18

(3 Hours) **(Total Marks: 80)**

N. B.: 1. **Question number 1** is **compulsory**; attempt **any three** out of remaining five questions.
2. Assume suitable **data** if **required** and mention it clearly.
3. **Answer and design** must be in accordance to **IRC and bridge rules.**
4. **Support answers** and **solutions** with suitable **sketches.**

1. Attempt any four

(a) What are different components of lattice girder? also explain how load get transferred from train to the lattice truss girder, support your answer with sketch. **[05]**

(b) What is difference between a fixed and an expansion type bearing? Explain functioning of one bearing of each type with neat sketches. **[05]**

(c) What is a well foundation? What are various shapes of well foundations? Also sketch components of well foundation **[05]**

(d) What are various methods of launching of girders? Explain any one in detail. **[05]**

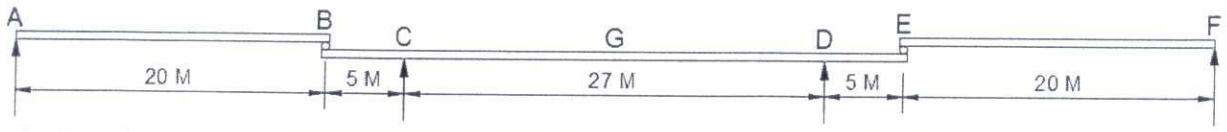
(e) What do you mean by "Economic Span Length" of bridge? Develop equation for the same. What are its limitations? **[05]**

2. (a) What is the provision to account dynamic effect of imposed load for roadway bridges? How different factors influence on it? Calculate impact factor for the following cases. **[05]**
i. A PSC deck slab bridge of span 14m is to be designed to carry IRC Class-A vehicle.
ii. A PSC longitudinal girder for a bridge of span 30m is to be designed to carry IRC Class-70R tracked vehicle.

(b) Locate position of IRC Class A train of vehicles along and across a PSC girder bridge of span 25m to produce maximum Bending Moment in a critical girder. Carriage width is 7.5m. Longitudinal girders are provided at 2.5m c/c and cross girders are provided at 5m c/c. **[15]**

3. A road bridge on a national highway has effective span 12 m, depth of deck is 500 mm and thickness of wearing coat is 90 mm. It is subjected to LLBM 182 kN-m due to IRC vehicular loads and DLBM 200 kN-m. Considering loss ratio 0.85 and f_p = 1700 MPa, f_i = 1250 MPa, f_{ck} = 60 MPa, f_{ci} = 50 MPa and this is class 1 type structure. Determine suitable arrangement of Freyssinet cables containing 12 wires of 7mm diameter, suggest spacing and locate cables in safe zone with proper profile. Stresses must be within permissible limits in the extreme fibers of the slab. Check the section for under and over reinforced for Severe conditions. **Check against shear and design of end blocks are not expected.** **[20]**

4. (a) Design Section **A** and Section **C** of following **Balanced Cantilever Bridge.** **[10]**
IRC Class AA tracked vehicle is carried out over a bridge length of 77m.
Road width between kerbs are 7.5m and foot path on either side is 1.2m.
Spacing between T-beam is 1.8m and width of girder is 450mm.
Thickness of deck slab and wearing coat are 200mm and 90mm respectively.
Materials; M25 grade concrete and Fe-415 grade HYSD bars are used.
Design of Deck slab is not expected.



Arrangement of span in Balanced Cantilever Bridge

(b) Define: Bridge, culvert, foot bridge, High level bridge, submersible bridge, deck bridge, through bridge, semi through bridge. **[04]**

(c) What is permissible limit for tilt or shift of a well foundation? Enlist different method to rectify tilt, explain any one. **[06]**