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		✓	
2	Construction Engineering	CE-C802		✓	
3	Construction Management	CE-C803		✓	
4	Elective II	CE-E804		✓	
5					
6					

Note: SC – Softcopy, HC - Hardcopy

(Shaheen Ansari)
Librarian, AIKTC

CBSGS

BE-Sem-VIII - Civil - PDRCS   8/5/18

Q.P.Code: 37774

(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. All sketches must be drawn on **drawing sheet.**

Q 1 Attempt following questions.

a. Explain different types of reinforcing steel used in beam, column, two way   05
slab and isolated footing with neat sketches

b. Write a short note on design of staging for a overhead water tank   06

c. Explain any three general guidelines to be considered while planning a   05
staircase.

d. Explain the reason for scissor joint in staircase reinforcement.   04

reinforcement
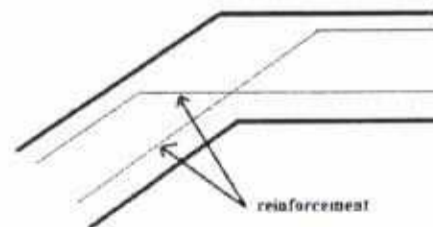
Q 2 Following figure shows the framing plan of a residential building. Floor to
floor height is 3.2 m. Grade of concrete is M 20 and steel is Fe 415. All
columns are 300mm ×300mm in size

TURN OVER

Figure 1

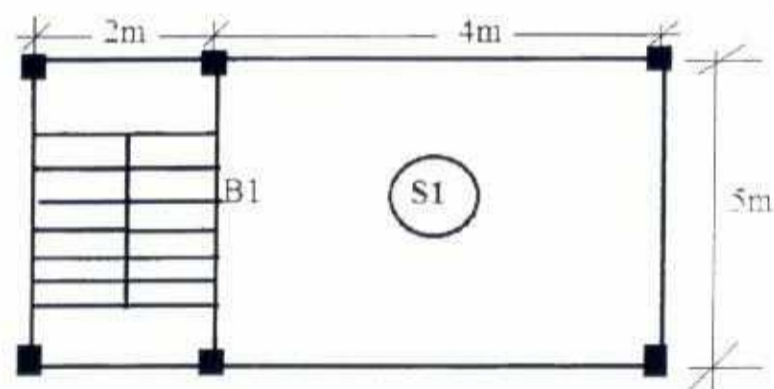|		
a)	Design the slab S1	08
b)	Draw the reinforcement details of slab S1	02
c)	Design beam B1	08
d)	Draw the reinforcement details of beam B1.	02

Beam B1 is provided with 8mm diameter stirrups @150 mm c/c throughout the length.

Q 3	a)	A building having floor to floor height as 4 m is to be provided doglegged staircase. Grade of concrete is M 20 and steel is Fe 415. Design the staircase.	14
		Draw the plan showing flight details	03
		Draw Reinforcement details in a flight	03

Q 4	Design by approximate method a rectangular tank 4 m × 4.5 m in plan and 4 in height. Tank is resting on firm ground. Grade of concrete is M25 and steel is Fe 415 check the design for safe stresses.

Design the following
   a) Side walls
   b) Base slab

Draw neat sketches showing the reinforcement details	04

Q 5 A reinforced concrete cantilever retaining wall is supporting a backfill of height 4.8 m above ground. Take density of soil = 18 kN/m^3. Angle of repose =30^0. SBC of soil = 150 kN/m^3 and coefficient of friction between concrete and soil =0.40. Grade of concrete is M20 and steel is Fe 415.

    a) Design the retaining wall and show all stability checks.   16

    b) Draw reinforcement details of toe and stem with curtailment of   04
       reinforcements.

Q 6 a) Following figure shows the layout plan of the columns of a building. Design a   12 raft foundation for the building. Take net bearing capacity = 80 kN/m^3. Each Corner column carries a load of 700 kN. Central columns carry load of 1000kN.

Draw a neat sketch showing reinforcement details   03
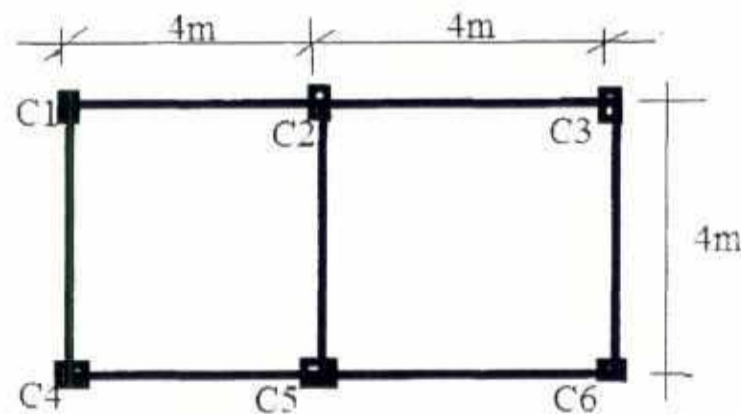

Figure 2

  b) Suggest types of foundations (with neat sketches) that can be provided for   05 following conditions.

   (1) Foundation of column close to boundary

   (2) Multistoried building on low bearing capacity soil.

(3 Hours)   [Total Marks: 80

Note:
   i. Q. No. 1 is **compulsory**
   ii. Attempt **any 3** out of remaining 5
   iii. Support all **theory and numerical** with neat sketch

1.   Explain any four   (20 M)
   A.   Stone Crushing Equipments
   B.   Bulldozers and Power Shovel
   C.   Forms for Concrete
   D.   Drilling and Blasting Equipments and Pattern
   E.   Standard and Special equipments
   F.   Cranes

2. A.   You are appointed as a 'Equipment Planner' for a Project site. Project details are as   (10 M)
         follows: a). A high-rise structure is to be constructed with Stilt+ Podium + 30 storey.
         b). Due to low soil SBC, Pile foundation is recommended.
         c). Concreting plant is to be set up at a space on-site.
         You need to plan various construction activities and construction equipment &
         machinery required for the same at various construction stages.
   B.   Explain in detail about Mass Concreting and Vacuum Concreting along with neat   (10 M)
         sketches.

3. A.   Discuss the following ground improvement techniques   (10 M)
           a. Sand drains
           b. Stone Columns
   B.   Explain the method of construction of diaphragm wall. It is constructed along the plot   (10 M)
         size 120m x 80m and it is 8m in height. Draw a neat sketch and discuss step by step
         procedure. Enlist the equipments.

4. A.   A bull dozer is purchased for Rs. 30,00,000/- It has a useful life of 10 years at the end of   (15 M)
         which salvage value is Rs. 5,00,000/- It has a horse power of 150 and runs on a diesel
         engine. Cost of diesel is Rs. 60/- per litre. Consider 20% of average investment cost
         towards financing, taxes & insurances. The machine works for 3000 hours in a year.
         The maintenance and repair cost is 50% of depreciation. Consider lubricant cost as 25%
         of fuel cost. The Operating factor is 0.8. The operators monthly salary is Rs. 5000/- .
         Consider field repair and servicing cost as 30% of depreciation cost.
   B.   What are the different factors for selection of Construction Equipments?   (05 M)

Turn Over

5. A. Explain method of tunnel driving mention below: (12 M)
   a). Full face heading
   b). Heading & Bench Method
   c). Drift Method
   d). Pilot Tunnel Method

   B. Explain Tunnel Boring Machine in detail with neat sketches. (08 M)

6. A. Λ construction equipment cost Rs. 20 lakhs, Salvage Value is Rs. 3 lakhs and economic (12 M)
   life of the equipment is 10 years. Calculate the depreciation & Book Value for each year
   by Straight line Method, Sinking Fund Method, Sum of year digit Method and Constant
   percent method.

   B. Explain Single and Double Acting Hammers with neat sketch. (08 M)

(Time: 3 Hours)   [Total marks : 80]

NOTE:.

- Question No. 1 is compulsory.
- Attempt any THREE out of the remaining five questions.
- Figure to the right indicates full marks
- Assume any suitable data and clearly state the same.

Q.1a) Following table shows the activities, their interdependence and the durations.   10

Activity	A	B	C	D	E	F	G	H
Preceding activity	--	A	A	B	B	C,E	D,F	C,E
Duration (days)	5	7	9	4	6	7	5	4

   a) Draw a A-O-A network
   b) Work out all activity times and floats
   c) Identify the critical path and the project duration.

b) Define, Construction Management & explain all functions of Construction Management.   10

Q.2a) A small project is composed of seven activities as given below: 12

Activity	A	B	C	D	E	F	G
Preceding Activity	----	----	A	A,B	C,D	E	C,D
to(days)	2	3	5	4	5	2	3
tm(days)	4	5	7	7	9	4	6
tp(days)	6	7	9	10	14	6	9

Z	-3.0	-2.0	-1.0	0	+1.0	+2.0	+3.0
P (%)	0.13	2.28	15.87	50	84.13	97.72	99.87

i)   Draw project network
ii)   Find expected duration, standard deviation and variance of all activities.
iii) Calculate the project duration corresponding to 75% probability?
iv) What is the probability that the project will be completed 3 weeks earlier than
     the expected date?

b) Explain the time estimates considered in PERT analysis?   08

Q.3a) The following table shows the details of activities of a small project.   10
    Calculate the optimum project cost & project duration. Indirect cost = Rs. 1500 / per day.

Activity	Predecessor	Normal		Crash	
		Time (days)	Cost (Rs).	Time (days)	. Cost (Rs).
A	-----	9	8000	6	9500
B	------	5	5000	3	5500
C	B	7	6500	4	10500
D	A	6	7000	4	10000
E	A	5	4500	3	7500
F	D	9	5500	5	9000

b) Explain i) Quality control with its importance in construction projects.   05
    ii) A-B-C analysis   05

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Q.4a) Table below shows activities, their durations and labour requirements:

Activity	Duration	Labours
A(10-20)	4	3
B(10-30)	5	4
C(20-50)	7	2
D(30-40)	5	5
E(30-50)	4	3
F(40-50)	6	3

Draw Time scaled version network. Workout daily requirement of labours for all activities. Prepare histograms of EST &LST schedule.
Which schedule you will prefer & why? 12

b) Explain functions of human resource management in detail. 08

Q.5a) i)Determine NPV of given cash flow stream of a project.Also comment whether project can be accepted or not? Rate of interest = 7 %. 06

Year	0	1	2	3	4	5
Cash flow (Rs)	2,00,000	50,000	60,000	60,000	70000	75,000

ii) Expain ,Time value of money. 04

b) What is an accounting? Also explain generally accepted principles of accounting? 10

Q.6) Write notes on following (Any 5) 20
i) Network Rules   ii) Mile stone chart   iii) Economic Order Quantity
iv) Performance Evaluation of worker   v) Application of Primavera
vi) Sources of funds required for a project. vii) Safety campaign

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(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. **A** Attempt **any five**
   (a) Why wearing coats are provided in bridges?   [02]
   (b) Enlist the factors which influence the impact factor.   [02]
   (c) Which shape of pier is more convenient in flowing river, support your answer with sketch,   [02]
       proper justification is required.
   (d) What is minimum and maximum diameter of bar that can be provided in bridges? What is   [02]
       minimum clear cover to them under different conditions?
   (e) How do we calculate distribution reinforcement in RC deck Slab Bridge spanning in one   [02]
       direction?
   (f) What are permissible limits for Minimum Steel reinforcement in RC and PSC slabs.   [02]

1. **B**
   (a) Show the detail dimensions, number of lanes and loading arrangement for the IRC class A **and**   [05]
       combination of IRC class A wheeled and IRC class AA tracked vehicle for 13m carriage way
       width.
   (b) What are different components of lattice girder? also explain how load get transferred from   [05]
       train to the lattice truss girder, support your answer with sketch.

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

   (b) Locate position of IRC Class A train of vehicles along and across a PSC girder bridge of span   [15]
       30m 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.

3. A road bridge on a national highway has effective span 11.5 m, depth of deck is 500 mm and   [20]
   thickness of wearing coat is 100 mm. It is subjected to LLBM 182 kN-m due to IRC vehicular
   loads and DLBM 200 kN-m. Considering loss ratio 0.82 and f_p = 1700 MPa, f_i = 1400 MPa,
   fck = 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.

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 1.5m.
       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.
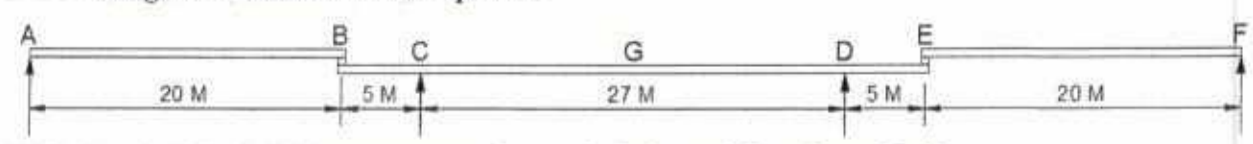
Arrangement of span in Balanced Cantilever Bridge

4. (b) What is a well foundation? What are various shapes of well 'foundations? Sketch components [05]
of well foundation.

(c) What are different types of Fixed bearing? Explain any one in detail. [05]

5. Determine design bending moment and shear force on longitudinal girder of a 24m span bridge, [20]
due to IRC Class AA tracked vehicle and self-weight of bridge superstructure. Clear carriage
width is 7.5m, footpath on either side is 1.5m and cross girders are provided at 4m c/c.
Thickness of deck stab is 250mm thickness of wearing coat is 90mm. Area of cross girder is
70% of area of longitudinal girder.
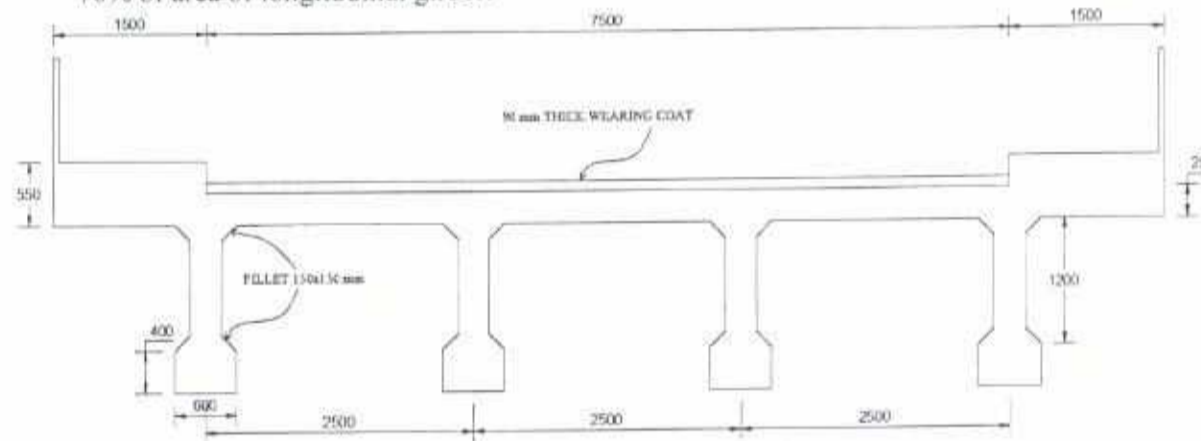
6. (a) What are different types of foundations used in bridges? How different factors influence type [05]
of foundation?

(b) Determine **Design forces** due to **dead** and **live load** in diagonal member L_3U_4 of a lattice [15]
girder bridge of **50m** span as shown below.

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)	16	17	18	19	20	21	22	23	24	25
Loading*	1695	1751	1820	1886	1964	2039	2123	2203	2280	2356
Span (m)	26	27	28	29	30	31	32	33	34	35
Loading*	2431	2506	2580	2654	2727	2801	2874	2954	3034	3113

Loading* = Total live load (kN) per track; Take CDA= [0.15+8/(6+L)]

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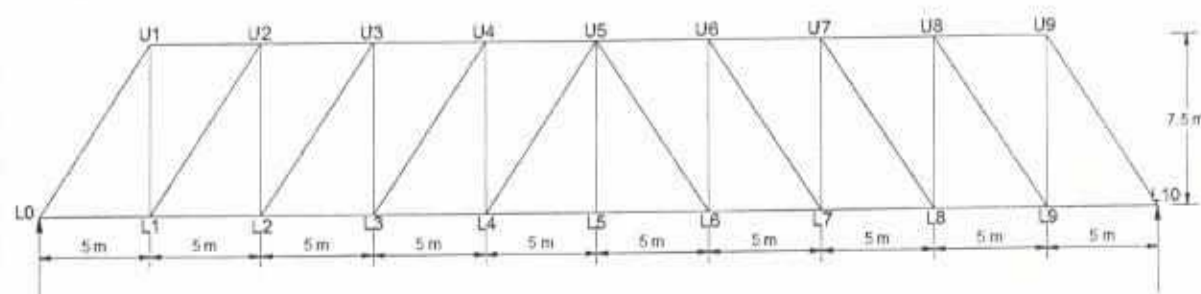
BI₌ – Sem–VIII – CBSGS– Civil – IWT   2/6/18

(3 Hours)   **[Total Marks 80]**

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

Q.1   Attempt any **four**   20

    a. State the importance of industrial waste treatment.
    b. What is off-line Equalization?
    c. Explain in brief proportioning of waste.
    d. A waste water effluent of 560 lit/s with DO = 3.0 mg/lit enters a river where the flow is 28 m³/sec with DO = 8.2 mg/lit. Determine the DO after mixing of waste water with the river water.
    e. What are the factors affecting self-purification of polluted streams?

Q.2 a. Explain in detail volume and strength reduction of industrial waste?   10

    b. Discuss briefly the various treatment methods available for sugar wastes. Which of them would you recommend for sugar mills in Maharashtra?   10

Q.3 a. With the help of neat flow sheet explain the manufacturing process of cotton cloth. Using cotton as raw material.   10

    b. A city discharges 120 cumecs of waste water into a river, which is fully saturated with oxygen and flowing at the rate of 1600 cumecs during its lean days with a velocity of 0.2 m/sec. The 5 day BOD of waste water is 260 mg/lit and that of river water is 2 mg/lit. Find when and where the critical D.O. deficit will occur in the downstream portion of the river, and what is its amount. Assume the coefficient of de-oxygenation (K_D) as 0.1 and coefficient of re-oxygenation (K_D) as 0.4.   10

Turn Over

Q.4 a. What is Environmental Impact Assessment? Why EIA is done? Explain the 10
same in the following context
i) Screening ii) Scoping iii) Prediction iv) Reporting

b. Explain with the help of flow sheet how you will treat wastes from 10
electroplating industry.

Q.5 a. Discuss with the help of manufacturing flow sheet the process that 10
contributes to industrial wastes in tannery industry. Give the major
characteristics of the wastes.

b. What is common effluent treatment plant? Draw flow diagram. State the 10
merits and demerits of it.

Q.6 **Write short note on** 20

a. Treatability study
b. Recovery of potash from distillery waste
c. Save all from Pulp and Paper Industry
d. Role of anaerobic treatment in Industrial Waste Treatment