

Q.P. Code: 11751

(CBSGS)

[TIME 4 HRS]

[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.

- Q 1 Attempt the following 20
- a. Explain the statement "Limit state method combines best of working stress method and ultimate load theory".
 - b. Write a note on types of water tanks and explain how their design requirements change.
 - c. Explain difference in behavior of cantilever and counter fort retaining walls.
 - d. What is the purpose of using following types of steel in RC members.
 - i. Lateral tie in column.
 - ii. Main steel and distribution steel in slab
 - iii. Stirrups in beams.
- Q 2 The framing plan of a residential building is shown in Figure 1. The design live load is 3 kN/m^2 and floor finish load is 1.5 kN/m^2 . All external walls are 230 mm thick and internal walls are 150 mm thick. Floor to floor height is 3.2 m. Grade of concrete is M20 and steel is Fe 415. All columns are 450mm x 450 mm in size. 20

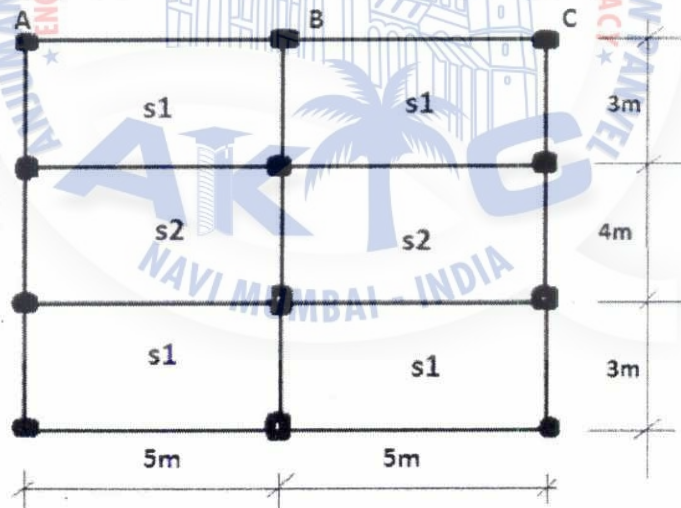


Figure 1

Design the following and draw neat sketches showing the reinforcement details.

- i. Slab S2
- ii. Beam ABC

Q.P. Code: 11751

- Q 3 Design by approximate method a rectangular tank 5 m × 4.5 m in plan and 3.5 m 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 and Draw neat sketches showing the reinforcement details
- Side walls
 - Base slab
- Q 4 A building having floor to floor height as 3.1 m is to be provided an open well staircase. Design the open well staircase. Draw the plan showing flight details, mid landing etc. and draw Reinforcement details in a flight. Use materials concrete is M20 and steel Fe 415
- Q 5 Design a reinforced concrete cantilever retaining wall supporting a backfill of height 4.5 m above ground. Take density of soil = 19 kN/m^3 . Angle of repose = 30° . SBC of soil = 200 kN/m^3 and coefficient of friction between concrete and soil = 0.55. Grade of concrete is M20 and steel is Fe 415. Design the stem and toe of wall and show all stability checks. Draw reinforcement details of toe and stem with curtailment of reinforcements.
- 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 = 100 kN/m^2 .
 Load on columns C1 and C3 = 750 kN.
 Load on columns C2 and C4 = 1000 kN.
 Load on columns C5 = 1200 kN.
 Draw a neat sketch showing reinforcement details

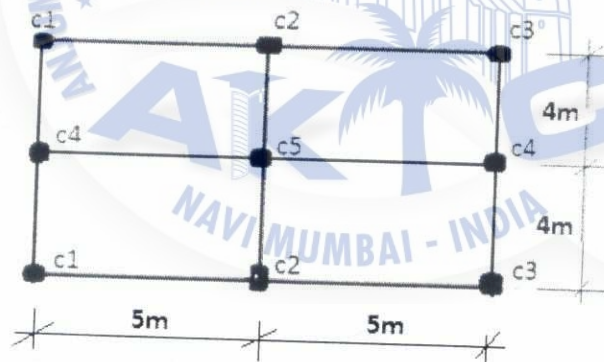


Figure 2

- b. Explain types of foundations (with neat sketches) that can be provided for following conditions.
- Black cotton soil up to depth of 10 m.
 - Foundation of column close to boundary
 - Multistoried building on soil having low bearing capacity.

03

BE-Sem VIII - CBSGS - (Civ) - CE

Q.P.Code:17045

[REVISED COURSE]

(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.1 A) Classify the construction equipments based on their performance. Explain the role of construction engineer in construction industry. 10
B) Enlist the different methods of tunneling in Hard rock. State the various stages in construction of tunnel along with the equipments required. Describe with neat sketches how would you proceed to carry out tunneling in rock by the heading and benching method. 10
- Q.2 A) What is meant by balancing of equipment? Cycle time of power shovel of 2 m³ capacity is 30 seconds. Truck of 8 m³ and 12 m³ are available at rate of Rs. 800 and Rs. 1200/day respectively for 10 hrs. The cycle time of 8 m³ truck is 14 minutes. And 12 m³ trucks are 16 minutes. How do you balance the operation of shovel and truck with least idle time and minimum cost. 10
B) What are commonly used hoisting equipments in construction industry? Explain tower crane with neat sketch with respect to types, components, working suitability and factors affecting its performance. 10
- Q.3 A) Classify various aggregate producing equipments. Describe jaw crusher with neat sketch stating components and it's working. 10
B) Define shotcreting. What are the different methods of shotcreting? State the application of shotcreting with merits. 10
- Q.4 A) What do you understand by ground improvement? What properties of ground are improved by sand drains? Discuss the ground improvement technique by sand drain with a neat sketch stating diameter, depth, spacing and specification of sand to be used.. 10
B) Describe different types of blasting materials along with their constituents? What precautions are required to be taken during transportation and storing of blasting materials? 10
- Q.5 A) Describe lining of tunnel in detail. Explain the method of concrete lining in tunnel. 10
B) What is mass concrete? What are the effects of mass concreting during and after placing? What precaution will you take for mass concreting? Explain. 10
- Q.6 Write short notes on any four 20
i- Types of Cladding
ii-Grouting
iii-Slip form work techniques
iv-Drilling pattern
v-Dozer

(3)

BE - Sem-VI - CBSGS - Civil - BDE

13/12/17

Q. P. Code : 26135

(3 Hours)

[Total Marks : 80

- N. B. :** 1. Q.No.1 is **compulsory**. Attempt **any three** out of remaining **five** questions.
 2. Assume suitable **data** if **required** and mention it **dearly**.
 3. Answer and **design** must be in accordance to IRC and bridge rules.
 4. Support **answers** and **solutions** with suitable **sketches**.

Q1. A] What are different types of bridges "on the basis of nature of traffic, loading, number of lanes, position of carriage way and load transfer mechanism?" [05]

B] Write a note on Box Girder Bridge. [05]

C] Write a note on IRC-Class A loading. [05]

D] What difficulties can arrives in sinking of well foundation and how those can be fixed? [05]

Q2. A] Determine design shear force and bending moment on longitudinal girder of a 32m span bridge due to imposed load only. Clear carriage width is 7.8m which is supported by 5 longitudinal girders and cross girders are provided at 4m c/c. Consider IRC Class AA tracked vehicle. [10]

B] What are different types of foundations used in bridges? How different factors influence type of foundation? [05]

C] Write note on: Dirt wall, wing walls and return wall [05]

Q3. A simply supported prestressed concrete deck slab bridge has to carry a Live Load moment and Dead Load moment of 160kN-m and 200kN-m respectively per meter width of carriage way at center of 12 m span. Take thickness of wearing coat 100mm and thickness of deck slab as 450mm. Check suitability of section in Limit State of Serviceability cracking. If modulus of section is insufficient suggest suitable changes. Determine prestressing force and eccentricity at mid span. Use M60 concrete and steel with f_p 1600MPa. Determine spacing of cables if PF in each cable is 1000kN. Consider that concrete has achieved its characteristic compressive strength at transfer. Take $\eta=0.8$ [20]

TURN OVER

Q. P. Code : 26135

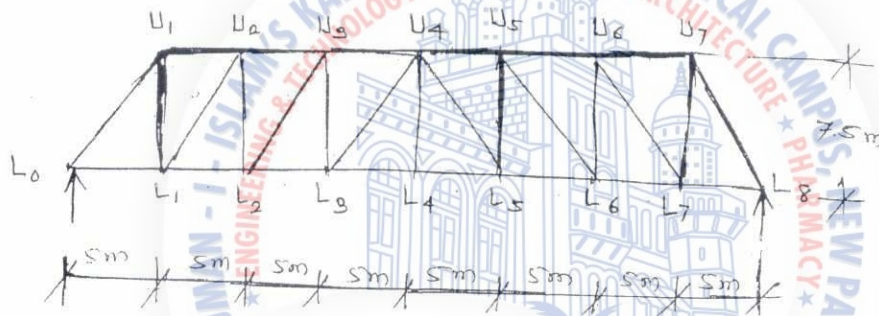
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Q4. A] Locate position of IRC-Class B train of vehicles along and across a prestressed concrete girder bridge of span 40m to produce maximum Bending Moment in a critical girder. Carriage width is 7.5m. Longitudinal girders are provided at 2.5 m c/c and cross girders are provided at 5 m c/c. [15]

B] Explain incremental and cantilever method of launching of concrete girders. In what circumstances they are preferred? [05]

Q5. A girder bridge has c/c distance between longitudinal girders 3m and between cross girders 5m. Design an interior slab panel for flexure to carry IRC Class-AA tracked vehicle. Consider 100mm thick wearing coat on 300mm thick RCC slab. Refer Piguard's curves. [20]

Q6. Determine design forces due to dead and live load in diagonal member L_2U_3 of a lattice girder bridge of 40m span as shown below.



Consider self weight of different elements per meter span per track as under:
Stringers; 3000N/m, Stock rails; 500 N/m, Guard rails; 400 N/m, Cross beams and bracings; 3000 N/m, Sleepers; 2000 N/m, Fasteners; 3000 N/m

Take self weight of each girder (top chord, bottom chord, diagonals and vertical members); 20000 N/m

Bridge is to be designed to carry a single track Broad Gauge Loading-1987 as under;

Span (m)	11	12	13	14	15	16	17	18	19	20
Loading*	1282	1377	1475	1558	1631	1695	1751	1820	1886	1964
Span (m)	21	22	23	24	25	26	27	28	29	30
Loading*	2039	2123	2203	2280	2356	2431	2506	2580	2654	2727

Loading* = Total live load (kN) per track

Take CDA = $[0.15 + 8 / (6 + L)]$

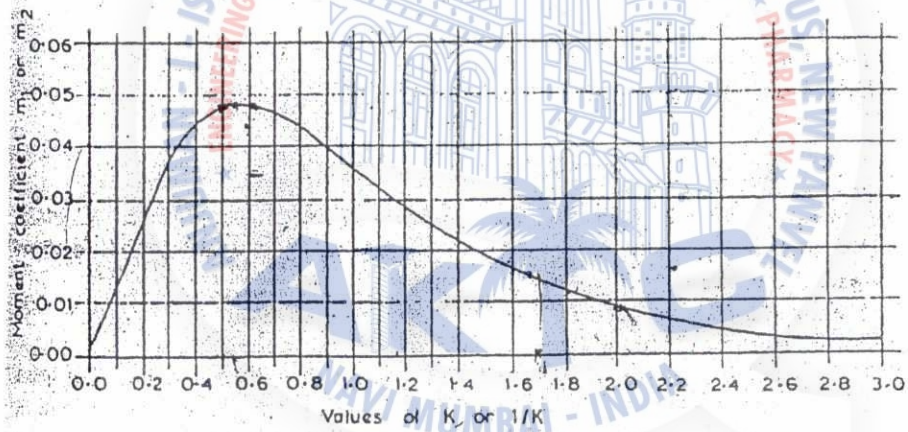
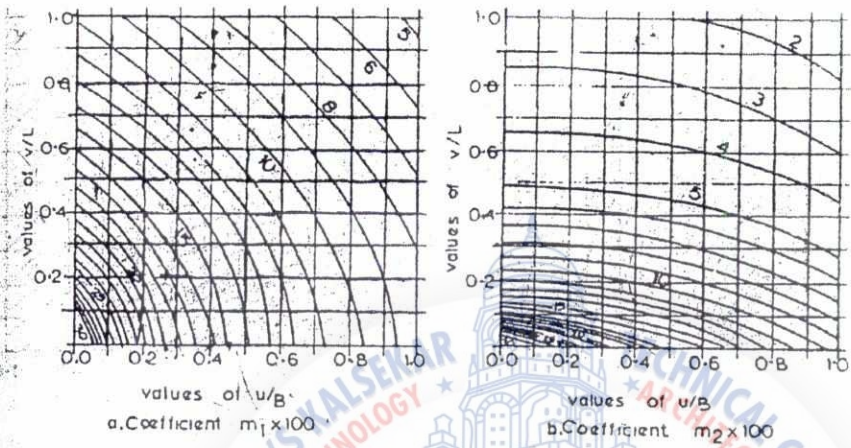
[20]

TURN OVER

Q. P. Code : 26135

3

Piguard's curves



Moment Coefficients for Slabs Completely Loaded with Uniformly Distributed Load, Coefficient is m_1 for K and m_2 for $1/K$

QP Code: 18081

(3 Hours)

[Total Marks: 80]

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

- Q.1 Attempt any **four**
- Write a note on physico-chemical methods used for treating Industrial waste water. **05**
 - State the characteristics of textile mill waste and suggest treatment accordingly. **05**
 - Draw a flow chart for odour treatment of refineries waste. **05**
 - Draw a neat diagram of off line equalization process. **05**
 - What is Sulphitation process in Sugar Industry? **05**
- Q.2
- Explain in detail Steps involved in EIA. How it differs from Environmental Audit. **10**
 - A stream saturated with DO, has a flow of $1.5 \text{ m}^3/\text{s}$ having BOD 25 mg/l , DO 7 mg/l and rate constant 0.14 per day. The average velocity of flow of the stream is 0.19 m/s . Calculate the DO deficit at point 25 km and 40 km downstream. Assume that the temperature is 20°C throughout and BOD is measured at 5 days. Take saturation DO at 20°C as 9.20 mg/l . **10**
- Q.3
- Explain in detail various methods for reducing strength and volume in industrial waste water. **10**
 - What treatment is recommended for tannery industry? Draw a neat flow diagram of treatment process. List byproducts that can be recovered. **10**
- Q.4
- Explain in detail dewatering of sludge and any two methods in detail. **10**
 - Draw a neat sketch of manufacturing process of paper industry showing waste water sources from the process. **10**
- Q.5
- State the characteristics of electroplating industry waste. Also explain method for reduction of hexavalent chromium to trivalent chromium. **10**
 - Explain in detail various byproducts obtained from dairy industry and the process of pasteurization. **10**
- Q.6 Write short note on (**Any four**): **20**
- Potash recovery
 - Alkaline Chlorination
 - Water Usage in Textile industry
 - Common Effluent Treatment Plant
 - Sampling of industrial waste