byjusexamprep.com

Paper–V

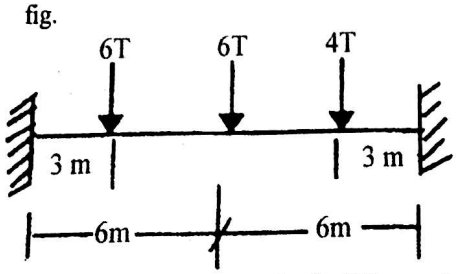
CIVIL ENGINEERING (Paper-I)

Section-I: (Subjective)

Candidates should attempt five questions in all. Question No. 1 is compulsory four of the remaining question should be attempted selecting at least one question each from section A. B & C.

1. Ans any two of the following:

(i) Find the fixed end moments for the beam shown in fig.



(ii) A T- beam of overall depth 550 mm has a rib width 300 mm. Find the shear reinforcement required for the beam section for a maximum shear force of 120 kN. Concrete used is MIS. Permissible tensile stress for the stirrups is 140 N/mm-. Percentage of tensile steel provided = 0.8% use 20 mm diameter bars.

(iii) What is the coefficient of consolidation? What is its use in the settlement analysis? How is it determined?

SECTION-A

2. A beam ABCD. 20 m long is continuous over 3 spans AB. BC and CD of 6 m. 8, and 6 m respectively. There is a uniformly distributed load of 1000 kg/ m on span. AB, a central load of 10000 kg on span BC and a load of 5000 kg on span CD at 2m from D. The ends A and D are fixed. During loading support B shanks by 10 mm. Find the fixed end moments and draw. B. M. diagram for the beam.

3. Design the base plate for a column ISHB 300 x 58.8 kg/ m carrying a load of 60 tonnes and bending moment of 10 tonne cm. It is to be supported on concrete pedestal having bearing capacity of 42 kg/cm2 Design also the concrete base if the bearing capacity of soil is 30 tonnes/m^2.

SECTION-B

4. (a) Due to consideration the size of the beam is restricted to 350 mm x 450 mm and span is 5.0 m. The beam has to carry on imposed load of 20 N/m. Used M 20 concrete and Fe 415 steel. Design the bean and show details. Design shear strength of M20 grade/concrete.

$100\ A_s/b_s$	0.25	0.50	0.75	1.0	1.25	1.50
z_c N/mm^2	0.37	0.48	0.57	0.61	0.67	0.73

(b) A short column of square section is to be designed to carry an axial load of 1023 kN. Design the column as per IS code. Permissible stresses in concrete and steel are 4 NI mm2 and 130 N/mm^2. 5/Apre-stressed concrete rectangular beam 300 mmx 600 mm is pre-stressed with a force of 1565 kN applied at 180 mm from the bottom. the force finally reducing to 1361 kN. The span of the beam = 12.20 in and carries two equal live loads 45 kN each at a distance of 4.60 metre front each support. Find the extreme fibre stresses at mid-span under (I) initial priestess and no live-load and (ii) final condition. Assume specific weight of concrete = 25 kN/m^3.

SECTION-C

6. (A) A retaining wall has vertical back and is 5.0 in high. The back face of the wall is smooth and the upper surface of the fill is horizontal. Determine the Rankine active pressure on the wall.

(i) before the formation of crack.

(ii) after the formation of crack.

Given C = 5.0 kN/mm^2 . $\phi = 30°$. $\gamma = 1.75$kN/m^3

(b) Define the earth pressure at rest. Show the earth pressure distribution on a retaining wall, for dry soil.

7. (a) Discuss the effect of water table on bearing capacity of soil.

(b) Discuss Meyerhofs bearing capacity theory. How does it differ from Terzaghi's theory?

(c) What do you mean by stability number? What is its utility in the analysis of stability of slopes?