Rohan Singhal

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION

B.Tech. Final Year (7th Semester)

COURSE CODE: 10M11CE111 DATE: 26-12-2021

COURSE NAME: CONSTRUCTION TECHNIQUES

COURSE CREDIT: 3 MAX. MARKS:35

General Instructions:

1) Read all the questions carefully and identify what has been asked in the question.
2) Write the theory answers in bullet points. Don't write unnecessary things which are not relevant to the question asked.
3) Mobile phones are not permitted in the exam room.
4) Use of scientific calculator is permitted.

---

1. Write the name of the theory used to determine the load on each beam in case of a two-way slab. With the help of diagrams, show the reinforcement detailing for one-way & two-way slab. (3 marks)
2. Differentiate between workability and consistency. Name the tests used to determine the workability and consistency of concrete & cement paste. Discuss the test for workability with the help of a diagram for test setup. (3 marks)
3. Make the bar bending schedule and calculate the total weight of steel that will be used for 8 m long beam. The cross-section of the beam is shown in figure 1. You can consider the following in your calculations: (5 marks)
    a. All the dimensions are in mm.
    b. Clear cover = 40 mm
    c. All reinforcement steel shall be HYSD bars of grade Fe 500 (TMT) and conforming to IS 1786.
    d. Reinforcement detailing shall be as per SP – 34 and IS: 2502.

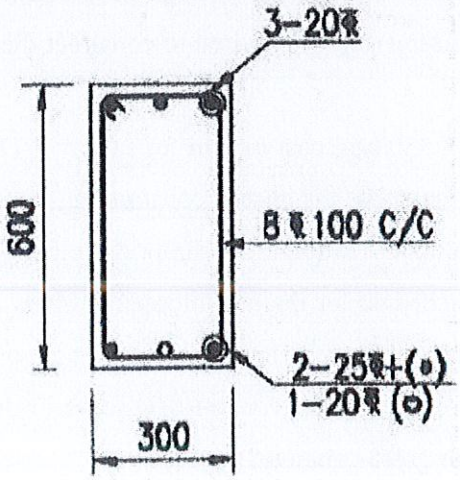

Figure: 1

4. For a 100 m long cable pit (figure 2), following information is given (2+2+2+4+4=14 marks)
   a. All the dimensions are in mm.
   b. Grade of concrete: M20
   c. Clear cover: 25 mm
   d. All reinforcement steel shall be HYSD bars of grade Fe 500 (TMT) and conforming to IS 1786.
   e. Shrinkage factor: 1.5

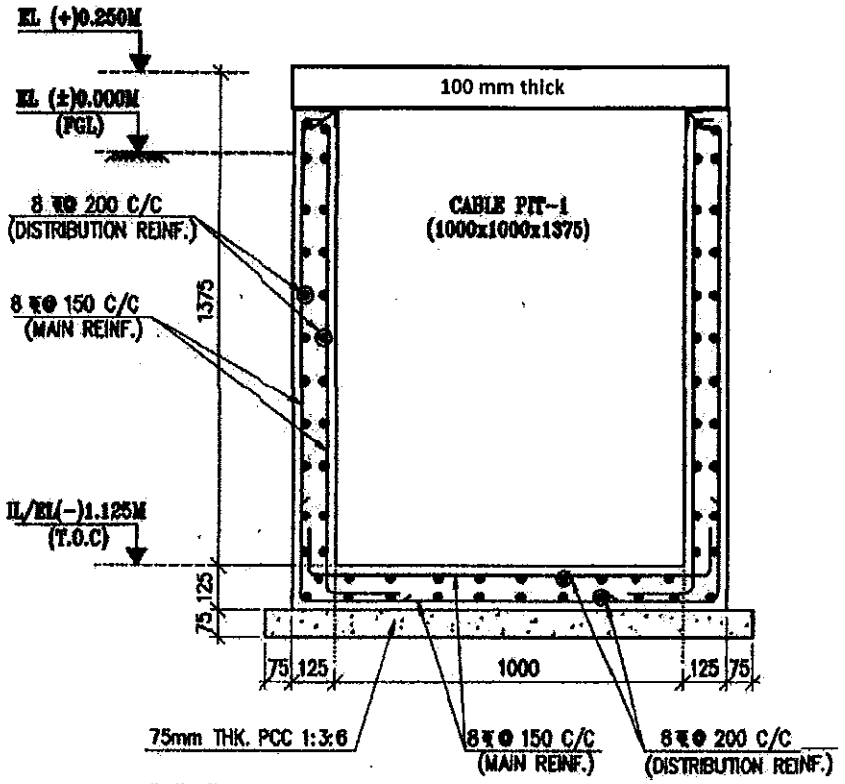

Figure: 2

   i. Calculate the volume of concrete and PCC required for this 100 m cable pit.
   ii. Calculate the total amount of cement (in kg) required to construct the given cable pit.
   iii. Calculate the amount of sand (in kg) required to construct the given cable pit. Take the density of sand as 2 kN/m^3.
   iv. If the cost of cement = ₹ 350/bag, cost of 1 m^3 of sand = ₹ 1100/m^3 and cost of 1 m^3 of coarse aggregate is ₹ 2200/m^3, calculate the cost of constructing 100 m of this cable pit. Assume other necessary details, if required. Mention the assumptions clearly.
   v. Make the bar bending schedule for main reinforcement bars and calculate the total amount of steel (in tonnes) used in main reinforcement for 10 m length of cable pit.

5. What are the various ways of placing the concrete? Discuss in detail. What can be the maximum value of compaction factor for green concrete? (1.5+.5 = 2 marks)

6. Write a short note on: (1+1+1+1 = 4 marks)

   a. Ready-mix concrete

   b. Shotcrete

   c. Storage and staking of cement and steel at construction sites

   d. Immersion vibrators for compaction of Concrete

7. Differentiate between: (1+1+1+1 = 4 marks)

   a. Scaffolding and Formwork.

   b. Conventional formwork and Proprietary formwork

   c. Stud and Wales

   d. Plywood & Steel formwork

****

Annexure 1 HOOK AND BEND ALLOWANCES

(*Clauses* 3.1 *and* 3.2.1)

Nominal Size of Bar	Hook Allowance (*H*)						Bend Allowance (*B*)					
	Mild Steel Conforming to *IS: 432-1960 or to †IS: 1139-1959		Medium Tensile Steel Conforming to *IS: 432-1960 or to †IS: 1139-1959		Cold Worked Steel Bars Conforming to ‡IS: 1786-1961		Mild Steel Conforming to *IS: 432-1960 or to †IS: 1139-1959		Medium Tensile Steel Conforming to *IS: 432-1960 or to †IS: 1139-1959		Cold Worked Steel Bars Conforming to ‡IS: 1786-1961	
	Min	*Recommd*	*Min*	*Recommd*	*Min*	*Recommd*	*Min*	*Recommd*	*Min*	*Recommd*	*Min*	*Recommd*
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
5	75	—	75	—	75	—	75	—	75	—	75	—
6	75	—	75	—	75	—	75	—	75	—	75	—
8	75	—	90	—	105	—	75	—	75	—	75	—
10	90	—	110	—	130	—	75	—	75	—	75	—
12	110	—	130	—	155	—	75	—	75	—	75	—
16	145	—	175	—	210	—	80	—	90	—	95	—
20	180	—	220	—	260	—	100	—	110	—	120	—
22	200	—	240	—	285	—	110	—	120	—	130	—
25	225	—	275	—	325	—	125	—	140	—	150	—
28	250	310	310	365	365	475	146	155	155	170	170	195
32	290	350	350	415	415	545	160	175	175	190	190	225
36	325	395	395	470	470	610	180	200	200	215	215	250
40	360	440	440	520	520	680	200	220	220	240	240	280
45	405	495	495	585	585	765	225	250	250	270	270	315
50	450	550	550	650	650	850	250	275	275	300	300	350