Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

IV SEMESTER B.TECH (CIVIL) END SEMESTER EXAMINATIONS

APRIL/MAY 2019

SUBJECT: BASIC REINFORCED CONCRETE DESIGN [CIE 2203]

Date of Exam: **29/04/2019** Time of Exam: **2:00 PM to 5.00 PM** Max. Marks: **50**

Instructions to Candidates:

- Answer ALL the questions. Any missing data may be suitably assumed.
- Use of IS 456 – 2000 and SP-16 is permitted.
- Use limit state approach unless specified otherwise.

Sl. No.	Questions	Marks	CO
1A.	Distinguish between working stress method and limit state method of designs.	4	1
1B.	A beam 300 mm wide and 600 mm effective depth is reinforced with 4 bars of 20 mm dia. on the tension side. If the grade of concrete is M 30 and steel is Fe 415, state the type of beam. [Use working stress approach]	3	2
1C.	A singly reinforced beam of overall size 230 mm × 550 mm is reinforced with 3 bars of 20 mm dia. on tension side. Determine the moment of resistance of the beam. Consider an effective cover of 50 mm The grade of concrete is M 35 and steel is Fe 415.	3	2
2A.	Design the interior span of a continuous beam of size 300 mm × 500 mm with an effective span of 5.5 m for flexure. The beam is subjected to a dead load of 20 kN/m inclusive of self-weight and a live load of 17 kN/m at service conditions. Use M25 grade concrete and Fe415 steel. Consider 'mild' exposure condition. Check for deflection. (Design for shear is not required)	7	2
2B.	With neat sketches explain different types of footings.	3	4
3A.	Design a slab with effective spans of 7 m × 5 m. The corners of slabs are prevented from lifting and is discontinuous over two adjacent edges. The slab is subjected to a floor finish load of 0.8 kN/m^2 and a live load of 3 kN/m^2 at service conditions. The grade of concrete is M 25 and steel is Fe 415. The slab is exposed to 'moderate' exposure condition. (Design for torsion, shear and check for deflection is not necessary)	7	3
3B.	Explain the guidelines for the design of RCC compression members for, i) Minimum reinforcement ii) Maximum reinforcement and iii) Diameter of reinforcements.	3	4
4A.	Design a short column to carry a factored axial load of 3000 kN. The length of the column is 3.5 m and it is effectively held in position at both ends, but not restrained against rotation. Use M40 grade concrete and Fe 415 steel. The column has an effective cover of 45 mm.	5	4
4B.	Design a short column of size 250 mm × 550 mm is subjected to a factored	5	4

	load of 2500 kN and a factored moment of 250 kN.m about its major axis. Use M30 grade concrete and Fe 415 steel. Consider an effective cover of 55 mm.		
5A.	Calculate the short term deflection at the centre of a simply supported beam of span 4 m with a size 230 mm × 500 mm. The beam is reinforced with 4 bars of 12 mm diameter on tension side and carries a service load of 20 kN/m. Use M25 grade concrete and Fe 415 steel. Assume an effective cover of 50 mm. [Use working stress approach]	**6**	**5**
5B.	Calculate crack width at the location as indicated for a beam of size 230 mm × 450 mm as shown in the Fig. Q.5B The beam is reinforced with 3 bars of 16 mm diameter and is subjected to a bending moment of 140 kN.m at working condition. Use M20 grade concrete and Fe 415 steel. Assume an effective cover for all bars as 40 mm. [Use working stress approach]	**4**	**5**

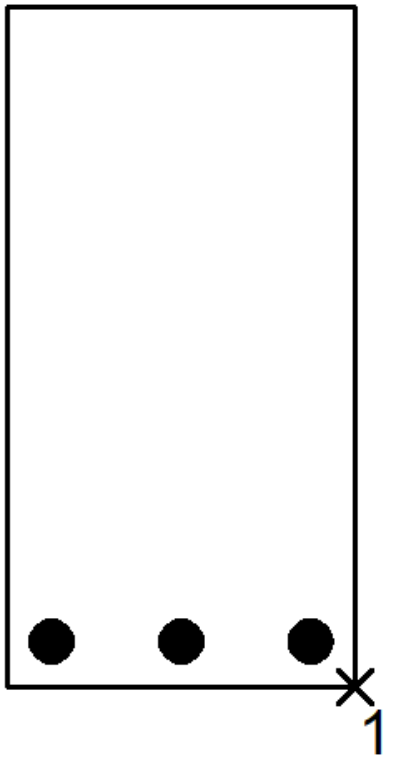

Fig. Q. 5B