Reg. No.



MANIPAL INSTITUTE OF TECHNOLOGY MANIPAL

(A constituent institution of MAHE, Manipal)

IV SEMESTER B.TECH. (CIVIL ENGINEERING) END SEMESTER EXAMINATIONS, APRIL/MAY 2018 SUBJECT: BASIC REINFORCED CONCRETE DIESIGN [CIE 2203] REVISED CREDIT SYSTEM

(23/ 04/ 2018)

Time: 3 Hours

MAX. MARKS: 50

Instructions to Candidates:

- ✤ Answer ALLthe questions.
- Missing data may be suitably assumed.
- ♦ Usage of IS: 456-2000 and SP-16 are permitted.
- Use Limit State Method of Design unless specifically mentioned

Q.No		Marks	CO
1A.	A reinforced concrete beam 230mm wide and an effective depth of 500mm is reinforced with 4 bars of 16mm diameter. Using M25 grade concrete and Fe 415 grade steel, calculate the moment of resistance of the section. (Use working stress method)	05	C01
1B.	Calculate the maximum stresses in concrete and steel if a beam of 300 mm wide and 550 mm effective depth is reinforced with 3 bars of 25 mm diameter and is subjected to a bending moment of 55 kN-m. Also state whether the section is under reinforced or over reinforced. The beam is made up of M25 grade concrete and Fe415 grade steel. (Use working stress method)	05	CO1
2A.	A beam has 300mm x 500mm overall cross section. Calculate the area of steel required, if the bending moment induced for a working load is 200 kN-m . Consider an effective cover of 40 mm for both tension and compression reinforcements. Consider 12 mm diameter bars as compression reinforcement and 25 mm diameter bars for tension reinforcement. Use M30 grade concrete and Fe415 steel	05	CO2
2B.	A simply supported beam with cross section 230mm wide and 600mm overall depth is reinforced with 4 bars of 16mm diameter on the tension side with an effective cover of 50mm. Calculate the safe UDL including the self-weight over an effective span of 4m. The materials used are M25 grade concrete and Fe415 grade steel.	05	CO2
3.	Design the end span of a continuous beam having an effective span of 5m carrying a factored dead load of 30kN/m and factored live load of 18kN/m . Carryout all the necessary checks as per IS:456-2000. The grade of concrete is M20 and grade of steel is Fe415 , the beam is located in mild exposure condition and assume breadth of the beam as 250mm .	10	CO3

4.	Design a slab over a room of size 3.5mx6.5m to carry a live load of 2.5 kN/m ² dead load due to floor finish is 1 kN/m ² . The slab is simply supported over all the 4 edges and the corners are not restrained against lifting. Adopt M25 grade of concrete and Fe 415 steel, exposure condition is moderate, support width of the wall is 230mm and carryout all the necessary checks as per IS:456-2000	10	CO4
5A.	Explain briefly different types of footings.	02	CO5
5B.	Design an axially loaded column with uniaxial bending moment, the dimensions of the column being 230mmx500mm. The factored axial load on the column is 1800kN and factored uniaxial bending moment of 150 kN-m about major axis, grade of concrete is M40 and grade of steel is Fe 415. Consider an effective cover of 40mm.	03	CO5
5C.	A simply supported rectangular beam of section 300mmx450 mm overall depth is reinforced with 4 bars of 20mm diameter as main reinforcement on tension side. The beam has an effective span of I6imwhich supports a total load of 20kN/m (DL+LL) inclusive of self-weight. Assuming M30 concrete and Fe 415 steel, calculate the short term deflection at mid span. Assume an effective cover of 40mm , Es= 200GPa (Use working stress method)	05	CO5