Reg. No.



MANIPAL INSTITUTE OF TECHNOLOGY MANIPAL

IV SEMESTER B.TECH. (CIVIL ENGINEERING) END SEMESTER EXAMINATIONS, APRIL/MAY 2017 SUBJECT: BASIC REINFFORCED CONCRETE DESIGN [CIE 2203] **REVISED CREDIT SYSTEM** (24/04/2017)

Time: 3 Hours

MAX. MARKS: 50

Instructions to Candidates:

✤ Answer ALL the questions.

✤ Missing data may be suitable assumed.

- Usage of IS: 456 -2000 and SP-16 is permitted.
- Use Limit State Method of Design unless specifically mentioned

1A.	A reinforced concrete beam of 350 mm wide and an effective depth of 650 mm is reinforced with 4 bars of 25 mm diameter on tension side. Considering M 25 grade concrete and Fe 415 grade steel, calculate the moment of resistance of the section. (Use working stress method)	05
1B.	Calculate the maximum stresses in concrete and steel in a beam of 300 mm wide and 550 mm effective depth, which is reinforced with 3 bars of 25 mm diameter on tension side. The beam is subjected to a bending moment of 55 kN-m . Consider M25 grade concrete and Fe 415 grade steel. (Use working stress method)	05
2A.	A simply supported beam has an overall cross section 230 mm x 550 mm and an effective span 4 m. Calculate the area of steel required if a load of 13.5kN/m, inclusive of its self-weight at working is acting on the beam. Use M 25 grade concrete and Fe 415 grade steel. Assume 16 mm diameter as tension reinforcement and 8 mm diameter as stirrups. And also assume exposure condition is moderate.	05
2B.	A cantilever beam with a cross section of 230 mm wide and 550 mm effective depth is reinforced with 3 bars of 20 mm diameter on the tension side. Calculate the safe UDL, the beam can carry including the self-weight over an effective span of 3 m. The materials used are, M 20 grade concrete and Fe 415 grade steel.	05
3.	Design the interior span of a continuous beam having an effective span of 5m. The dead load on beam inclusive of its self-weight is 20 kN/m and live load of 12 kN/m at working condition, do all the necessary checks as per IS:456 2000. Use M 25 grade concrete and Fe 415 steel. The exposure condition is moderate, and also sketch the reinforcement details.	10
4A.	Differentiate between working stress method and limit state method	02
4B.	Design a cantilever slab of clear span 2.5 m supporting on beam of 230 mm wide. Live load= 2 kN/m^2 , floor finish= 0.8 kN/m^2 . Do all the necessary checks as per IS 456: 2000. Adopt M 25 concrete, Fe 415 steel and severe exposure condition.	08

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5A.	Explain briefly different types of footings.	02	
5B.	Design a short square column for an unsupported length of 2.5m, with its both ends		
	hinged, to carry an axial factored load of 2000 kN adopt M 25 grade of concrete and	04	
	Fe 415 steel.		
5C.	Calculate the long term deflection due to shrinkage for simply supported beam		
	carrying total load of (DL+LL) of 40 kN/m. Beam of 350 mm x 650 mm overall		
	depth is reinforced with 4 bars of 20mm diameter on the tension side and 2 bars of	02	
	12 mm diameter on compression side. The beam has an effective span of 5m.	03	
	Assume M 20 grade of concrete, Fe 415 steel and effective cover as 50 mm. (Use		
	working stress method)		