MANIPAL INSTITUTE OF TECHNOLOGY

(A constituent unit of MAHE, Manipal)

VI SEMESTER B.TECH CIVIL ENGINEERING END SEMESTER EXAMINATIONS

APRIL/MAY-2019

SUBJECT: ADVANCED REINFORCED CONCRETE DESIGN [CIE 4014]

Date of Exam:

Time of Exam:

Max. Marks: 50

Instructions to Candidates:

- Answer ALL the questions
- ♦ Usage of IS 456:2000, IS 3370- Part IV and SP16 is allowed
- ✤ Assume M20 concrete and Fe415 steel for all questions
- Missing data , if any, may be suitably assumed

1.	Design an interior flat slab panel of size 5mX 5m for a Live Load of 3.5 kN/m^2 , Floor finish of 1 kN/m^2 and dead load due to self weight. The slab is supported by columns of size 0.6m X 0.6m without drop or column head.	10	CO2
2A.	A hall of dimension $32m \times 9m$ supported by portal frames at a c/c spacing of 4m. The unfactored load on the beam from the 120mm thick slab is found to be 15 kN/m (includes LL, Floor finish and Self weight of Slab). Height of column is 4m from the foundation. Assume foundation is fixed. If beam and column have a c/s of $300mm \times 550mm$, determine the factored reactions and moments in the frame.	6	CO3
2B .	Design the longitudinal reinforcements at mid-span for the beam of portal frame described in Q.2A.	4	CO3
3	Proportion and check for stability of a cantilever retaining wall that retains a backfill of height 6m above the ground level. Also, determine design bending moment in toe. Density and angle of repose of the backfill soil is 16kN/m ³ and 30° respectively. Depth of foundation is 2 m below the ground level on toe side. Assume SBC of foundation soil as 190 kN/m ² .Coefficient of friction between soil and concrete is 0.5	10	CO4
4 A	Proportion a rectangular tank to store 80,000 litres of water resting on firm ground and rigid at the base. Head of water in the tank shall not exceed 2.5m. Determine design horizontal moments in the tank. Assume width to length ratio of 1:2 and freeboard of 100mm.	7	CO5
4 B	A flexible base circular water tank has thickness of 220 mm. If it is provided with 0.4% of reinforcement, then check the adequacy of the tank for a maximum hoop tension of 190kN.	3	CO5
5A	Determine the maximum direct tension and bending moment in side walls of a square bunker of size $4m \times 4m$ and height 3m when it is used to store grains of density 10 kN/m ³ and angle of repose 30°.	5	CO5
5B	Discuss the differences between limit state design and working stress design of structures.	3	CO1
5 C	With neat sketch list any four types of soil retaining structures.	2	CO4

