Roll No…….. **Total No. of Printed Pages: 2**

Total No. of Questions: [09]

B. Tech. (Civil Engineering) (Semester – 6th)
DESIGN OF CONCRETE STRUCTURES-II
Subject Code: BCIES1621
Paper ID: [19110726]

Time: 03 Hours **Maximum Marks: 60**

Instruction for candidates:

1. Section A is compulsory. It consists of 10 parts of two marks each.
2. Section B consist of 5 questions of 5 marks each. The student has to attempt any 4 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

Section – A **(2 marks each)**

Q1. Attempt the following:

a) What are the various conditions under which combined footing provided?
b) What are the functions of foundation in building?
c) What do you understand by term tread and riser?
d) What is Soffit?
e) What is meridional thrust and Hoop stress?
f) What are compression members?
g) What do you mean by uniaxial and biaxial bending?
h) List the types of loads and pressure acted on the retaining wall.
i) What is the maximum spacing of vertical stirrups in rectangular beams?
j) What are the various types of water tanks?

Section – B **(5 marks each)**

Q2. Design the stair for public building supported on wall on one side and stringer beam on other side. The horizontal span of stairs is 1.4 m. The risers are 120 mm and tread are 300 mm. Use M 20 mix and Fe 415 steel.

Q3. How the beams curved in plan differ from other beams? Derive the equations for Bending Moment, Twisting Moment and Shear Force for a beam circular in plan and supported on columns. Take suitable number of columns.

Q4. Design a circular water tank with a flexible base resting on the ground to store 50,000 liters of water. The depth of tank may be kept 4m. Use M 25 concrete and Fe-415 steel.

Q5. What are the stability checks in case of retaining walls? Explain the method of designing a shear key for the wall.

Q6. A rectangular column 300x400mm carries an axial load of 1500 KN. Design a foundation for the column. Bearing capacity of the soil is 15t/m^2. Use M30 concrete and grade of steel is Fe 415.

Section – C **(10 marks each)**

Q7. Design a trapezoidal slab footing is to be provided for columns of sizes 400x400mm and 600x600mm carrying loads of 600kn and 1000kn. The centre to centre distances of the columns are 4m. The property line is at a distance 0.3 m from the column carrying 600Kn. Length of footing is to be restricted to 5m. Prepare the layout plan of the footing and show the loading on longitudinal section. Given SBC of soil =150 kn/m^2.

Q8. A cantilever retaining wall to retain an earth embankment with a horizontal top 3.5 m above ground level. Density of earth=18kn/m^3. Angle of friction ϕ=30º. SBC of soil is 200kn/m^2. Take coefficient of friction between soil and concrete=0.5. Adopt M20 grade concrete and Fe 415 steel .Design toe and Heel slab of above data also Design shear key and Reinforcement detail of above data.

Q9. Design a spherical dome over a circular room of 20 m diameter. The rise of the dome may be taken equal to 1/5 of the diameter. The dome carries a lantern load of 30 kN attached at the circumference of an opening of 2 m diameter at the apex. Take live load due to wind etc. as 1.5 kN/m^2 of the surface area of the dome. Use M 20 Concrete and Fe 415 steel.