USN

Seventh Semester B.E. Degree Examination, Dec.2023/Jan.2024
Design of RCC and Steel Structures

Time: 3 hrs.   Max. Marks:100

Note: *1. Answer any ONE full question, selecting at least ONE question from each module.*
2. Use of IS456, IS-800, SP-6(1), SP-16 and steel tables may be permitted.
3. Missing data, if any, may be suitably assumed.

Module – 1

1   Design a slab type combined footing for two columns located 4.0m a part. The overall sizes of the columns are 400×400 mm and 500×500 mm and the service loads on them 1000kN and 1500kN respectively. The safe bearing capacity of soil is 250 kN/m. use M_{20} and Fe415 grade steel sketch the reinforcement details.   **(50 Marks)**

OR

2   Design a cantilever retaining wall to retain an earth embankment with horizontal having 4m above ground level. Density of back fill = $16kN/m^3$ SBC of soil = $150kN/m^2$, angle of internal friction $\phi = 30°$. Take co-efficient of friction between soil and concrete = 0.55, adopt M_{20} grade concrete and Fe415 Steel, sketch the reinforcement details.   **(50 Marks)**

Module – 2

3   Design a simply supported gantry girder to carry an electrically operated travelling crane with the following details :
Span of the crane bridge   = 25m
Span of the gantry girder   = 8m
Wheel base   = 3.5m
Crane capacity   = 200kN
Weight of crane bridge   = 150kN
Weight of crab   = 75kN
Minimum hook distance   = 1.0m
Weight of rail   = 0.30kN/m
Height of rail   = 105mm
Draw neatly section of gantry girder showing all details. Also draw stable view.   **(50 Marks)**

4   Design a welded plate girder of span 24m carrying a superimposed load of 50kN/m and two concentrated loads of 200kN each at one third span points of the span. Assume the girder laterally supported through out and yield strength of 250MPa. Provide curtailments. Draw a neat sketch of design details describing all the parts.   **(50 Marks)**

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