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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech IV Year II Semester Advanced Supplementary Examinations September-2021
ADVANCED STRUCTURAL DESIGN
(Civil Engineering)

Time: 3 hours

Max. Marks: 60

(Answer all Five Units 5 x 12 = 60 Marks)

UNIT-I

- 1 Design an interior panel of a flat slab with panel size 6 x 6 m supported by columns L4 12M
500mm x 500mm. without Provide suitable drop. Take live load as 5 KN/m². Use M20 steel and Fe 415 steel.

OR

- 2 Design an interior panel of a flat slab 5 m x 5 m for a live load of 10 KN/m² . Use L4 12M
M20 grade concrete and Fe415 steel respectively.

UNIT-II

- 3 Design a circular water tank with flexible base for a inside diameter of the tank is L4 12M
12.6m. The depth of tank may be kept 4m including a free board of 200mm. Use M20 concrete and Fe 415 steel.

OR

- 4 Design a rectangular RC water tank resting on the ground with an open top for a L4 12M
capacity of 60,000 litres. The inside dimension of the tank may be taken as 6m x 4m.
Design the side walls of the tank using M20 grade concrete and Fe 250 grade .

UNIT-III

- 5 Design and detail the various elements of counter fort retaining wall if the height of L4 12M
the wall above the ground level is 5.5. safe bearing capacity of soil(q_0) is 180KN/m²
.and angle of friction is 300 .keep spacing of counter fort is 3m. the coefficient of
friction between concrete and soil as 0.5. Unit weight of the back fill is 18 KN/m³
.Design of stem and toe not required. use M20 and Fe415.

OR

- 6 Design a cantilever retaining wall to retain earth for a height of 3.5m. The density of L4 12M
soil is 18 KN/m³ . Safe bearing capacity of soil is (q_0)=200 KN/m² . Take the
coefficient of friction between concrete and soil as 0.5. The angle of repose is
30degrees. Design of stem and heel not required. Use M20 concrete and Fe415 steel

UNIT-IV

- 7 Explain step by step procedure how to design a plate girder as per IS code. **L4 12M**

OR

- 8 Design a welded plate girder of span 20m to carry a super imposed load of 30 KN/m. **L4 12M**
avoid end stiffeners and intermediate stiffeners. Use Fe - 415 & (Fy250) grade steel

UNIT-V

- 9 Design a gantry girder without lateral restraint along its span, to be used in an industrial building carrying an overhead travelling crane, for the following data: **L4 12M**
(i) Crane capacity 200 KN. (ii) Self-weight of the crane girder excluding trolley 200 KN. (iii) Self-weight of the trolley, electric motor, hook, etc. 40 KN (iv) Approximate minimum approach of the crane hook to the gantry girder 1.20 m. (v) Wheel base 3.5 m. (vi) c/c distance between gantry rails 15 m. (vii) c/c distance between columns (span of gantry girder) 7.5m. (viii) Self-weight of rail section 300 N/m. (ix) Yield stress of steel = 20Mpa Checks for buckling and deflections are not required.

OR

- 10 Design a hand operated travelling crane simply supported by gantry girder for the given data: Span of gantry girder = 5 m, span of crane girder = 15 m, crane capacity = 200 KN, self-weight of crane girder excluding trolley = 200 KN, self-weight of trolley = 30 KN, minimum hook approach = 1 m, distance between wheels = 3.5 m c/c, self-weight of rails = 0.3 KN/m. Checks for buckling and deflections are not required. **L4 12M**

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