CODE NO: 07A80101 | R07 | SET No - 1

IV B.TECH - II SEMESTER EXAMINATIONS, APRIL/MAY, 2011
ADVANCED STRUCTURAL DESIGN
(CIVIL ENGINEERING)

Time: 3hours **Max. Marks: 80**

Answer any FIVE questions
All Questions Carry Equal Marks
- - -

1. Design a cantilever retaining wall to retain earth 3.0 m high above ground level. Use the following data:
   The density of earth is = 18 kN/m^2
   Angle of internal friction is = 30^0
   The safe bearing capacity of soil is = 180 kN/m^2
   The coefficient of friction between soil and concrete is = 0.4
   Use M 20 grade of concrete and Fe 415 steel. [16]

2. Design a circular water tank 3.5 m high, resting on the ground to store 60,000 liters of water. Use M 25 grade of concrete and Fe 415 steel. Draw the reinforcement details. [16]

3. Design the tank walls, bottom plates and the supporting stays of over head rectangular steel water tank for a capacity of 100,000 liters. The depth of the tank is 4 m and the staging consists of four columns. The height of the staging is 8 m. [16]

4. Design a circular bunker of capacity 250 kN to store cement. The angle of repose of cement is 20^0. Use M 25 grade of concrete and Fe 415 steel. [16]

5. Design the interior slab panel of a reinforced concrete T-beam bridge using the following data:
   Clear width of road way = 8 m
   Effective span = 18 m
   Use M 20 grade of concrete and Fe 415 steel. [16]

6. Design a welded plate girder of 25 m effective span to support 75 kN/m uniformly distributed live load over the entire span. [16]

7. Design the top chord members of a Warren type through railway bridge steel truss of span 50 m to support the broad gauge single track loading. [16]

8. A reinforced concrete framed building 42 m × 15 m in plan and 54.6 m height consists of 4.2 m high storeys. It consists of rigid frame action in the longitudinal direction and reinforced concrete infill wall in the transverse direction. Determine the design wind forces on the building. [16]

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CODE NO: 07A80101 | R07 | SET No - 2

IV B.TECH - II SEMESTER EXAMINATIONS, APRIL/MAY, 2011
ADVANCED STRUCTURAL DESIGN
(CIVIL ENGINEERING)

Time: 3hours **Max. Marks: 80**

Answer any FIVE questions
All Questions Carry Equal Marks
- - -

1. Deign a counter fort retaining wall to retain earth 4.5 m above ground level using the following data:
   Spacing of counter forts = 3 m c/c
   The density of earth = 16 kN/m^2,
   Angle of internal friction = 25^0.
   The safe bearing capacity of soil = 175 kN/m^2,
   The coefficient of friction between soil and concrete = 0.5
   Use M20 grade of concrete and Fe 415 steel. [16]

2. Design a rectangular water tank of size 4 m × 3 m and 4 m deep resting on ground. Use M 20 grade of concrete and Fe 415 steel. Draw the reinforcement details. [16]

3. Design a circular steel water tank and its staging for a capacity of 80,000 liters. The height of staging is 10 m. [16]

4. Design a circular bunker of capacity 200 kN to store coal. The angle of repose of coal is 25^0. Use M 20 grade of concrete and Fe 415 steel. [16]

5. Design a reinforced concrete slab bridge using the following data:
   Clear width of road way = 7.5 m
   Clear span = 8 m
   Use M 20 grade of concrete and Fe 415 steel. [16]

6. Design a gantry girder to carry over head traveling crane for an industrial building using the following data:
   Capacity of crane = 150 Kn
   Weight of crane excluding trolley = 75 kN
   Weight of trolley = 50 kN
   Distance between centers of gantry girder = 16 m
   Distance between centers of crane wheels = 2.5 m
   Span of gantry girder = 8 m
   Weight of rail section = 0.3 kN/m
   Height of rail section = 75 mm. [16]

7. Design the top bracing and the portal bracing for a railway bridge consisting of two trusses, 6 panels of 5 m each and height 8 m. The exposed area for calculation

of wind forces on top bracing is 0.75 m^2/ m run of the top chord. Assume the intensity of wind pressure is 1.5 kN/m^2. [16]

8. Determine design seismic load on a RC frames of an office building shown in Figure 1. The building is located in Imphal. The soil condition is medium stiff. The reinforced concrete frames are without brick masonry infill. The lumped weight due to dead load is 10 kN/sq.m.

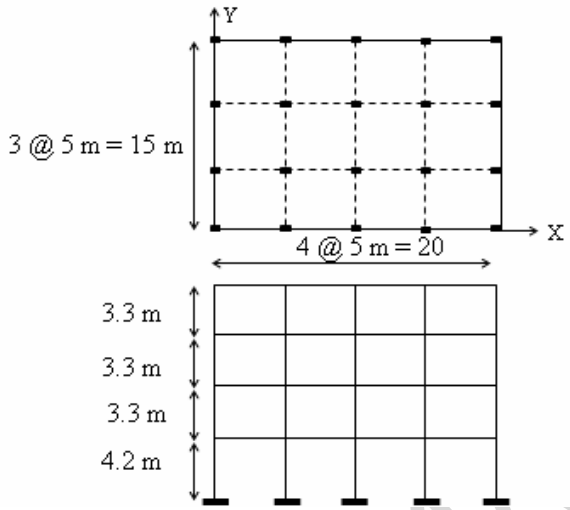

fig.: 1

on floors and 8 kN/sq.m on roof. The floors are to carry a live load of 4 kN/sq.m on floors and 2.5 kN/sq.m on roof. [16]

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CODE NO: 07A80101 | R07 | SET No - 3

IV B.TECH - II SEMESTER EXAMINATIONS, APRIL/MAY, 2011
ADVANCED STRUCTURAL DESIGN
(CIVIL ENGINEERING)

Time: 3hours **Max. Marks: 80**

Answer any FIVE questions
All Questions Carry Equal Marks
- - -

1. Design the heel slab and the counter forts of a counter fort retaining wall using the following data:
   Height of back fill = 4.0 m
   Spacing of counter forts = 3.5 m c/c
   The density of back fill is = 20 kN/m^2
   Angle of internal friction is = 28^0
   The safe bearing capacity of soil is = 160 kN/m^2
   The coefficient of friction between soil and concrete is = 0.5
   Depth of foundation = 1.2 m
   Use M20 grade of concrete and Fe 415 steel. [16]

2. Design the tank wall and the top ring beam of a flat bottom circular elevated water tank with roof dome of diameter 8 m and 3.5 m total high. It is to be supported by a ring beam of diameter 6 m. The ring beam is to be supported by six columns equally placed. Use M 25 grade of concrete and Fe 415 steel. [16]

3. Design a rectangular steel water tank and its staging for a capacity of 75,000 liters. The height of staging is 8 m. [16]

4. Design a silo with 4.5 m diameter, 18 m height of cylindrical portion and 0.5 m central opening to store coal. Use the following data:
   Unit weight of coal = 8.5 kN/m^3
   Angle of internal friction = 25^0
   Angle of repose = 25^0
   Pressure ratio = 0.7
   Use M 20 grade of concrete and Fe 415 steel. [16]

5. Design a reinforced concrete slab bridge using the following data:
   Clear width of road way = 8 m
   Clear span = 10 m
   Use M 25 grade of concrete and Fe 415 steel. [16]

6. Design a welded plate girder of 30 m effective span to support 60 kN/m uniformly distributed live load over the entire span. [16]

7. Design the bottom chord members of a Warren type through railway steel truss bridge of span 60 m to support the broad gauge single track loading. [16]

8. A reinforced concrete framed building 45m × 20m in plan and 60m height consists of 5m high storeys. It consists of rigid frame action in the longitudinal direction and reinforced concrete infill wall in the transverse direction. Determine the design wind forces on the building. [16]

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CODE NO: 07A80101 | R07 | SET No - 4

IV B.TECH - II SEMESTER EXAMINATIONS, APRIL/MAY, 2011
ADVANCED STRUCTURAL DESIGN
(CIVIL ENGINEERING)

Time: 3hours **Max. Marks: 80**

Answer any FIVE questions
All Questions Carry Equal Marks
- - -

1. Design a cantilever retaining wall to retain earth 3.5 m high above ground level, using the following data:
   The density of earth is = 20 kN/m^2
   Angle of internal friction is = 25^0
   The safe bearing capacity of soil is = 150 kN/m^2
   The coefficient of friction between soil and concrete is = 0.45
   Use M 25 grade of concrete and Fe 415 steel. [16]

2. Design a rectangular reinforced concrete water tank of size 5 m× 4 m resting on the ground with an open top for a capacity of 75, 000 liters. Draw the reinforcement details.
   Use M 20 grade of concrete and Fe 415 steel. [16]

3. Design a circular steel water tank and its staging for a capacity of 150,000 liters. The height of the tank above ground level is 9 m and is to be supported on eight columns. [16]

4. Design a chimney of height 60 m, using the following data:
   External diameter: At top = 4 m
   At base = 5 m
   Shell thickness: At top = 250 mm
   At base = 500 mm
   Thickness of fire brick lining = 100 mm
   Air gap = 100 mm
   Temperature difference = 75^0
   Wind intensity = 1.75 kN/m^2. [16]

5. Design a reinforced concrete slab bridge using the following data:
   Clear width of road way = 8 m
   Clear span = 10 m
   Use M 25 grade of concrete and Fe 415 steel. [16]

6. Design a gantry girder to carry over head traveling crane for a workshop building using the following data:
   Capacity of crane = 225 kN
   Weight of crane excluding trolley = 100 kN
   Weight of trolley = 80 kN
   Distance between centers of gantry girder = 15 m

Distance between centers of crane wheels = 3 m
Span of gantry girder = 7.5 m
Weight of rail section = 0.3 kN/m
Height of rail section = 75 mm [16]

7. Design the bottom lateral bracing and the portal bracing for a railway bridge consisting of two trusses, 4 panels of 6 m each and height 7.5 m. The exposed area for calculation of wind forces on top bracing is 0.75 m^2/m run of the top chord. Assume the intensity of wind pressure is 2.0 kN/m^2. [16]

8. Determine design seismic load on a RC frames of an office building shown in Figure 1. The building is located in Delhi. The soil condition is hard soil. The reinforced concrete frames are with brick masonry infill. The lumped weight due to dead load is 8 kN/sq.m on floors and 5 kN/sq.m on roof. The floors are to carry a live load of 3 kN/sq.m on floors and 2 kN/sq.m on roof. [16]

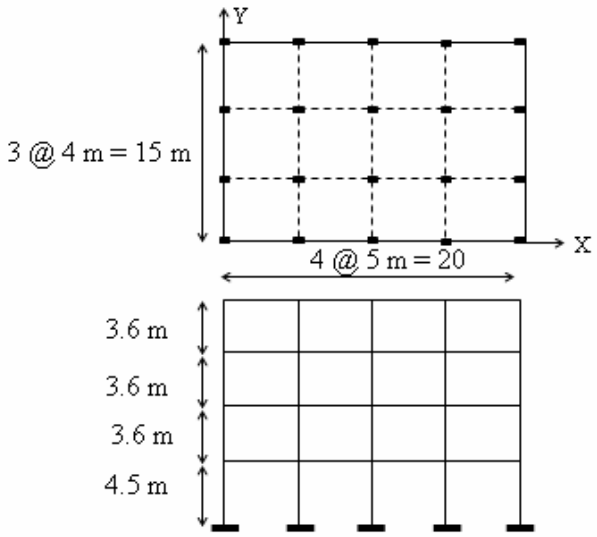

Figure 1

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