Maximum Marks: 40  
Credits: 05  
Duration: Two Hours

Assume suitable data if missing.

Q.No.  

SECTION A

1  Draft sections showing fire protection of steelwork in the following structural elements. Also specify the fire resistance protection for different thicknesses. (Attempt any 02)
   (a) Steel filler beam floor
   (b) Solid protection for pillar on external wall
   (c) Hollow protection of steel pillars

2  Draft Section for a Passenger traction lift and specify all the key components.  

OR

2'  Draft the following on a suitable scale. (Attempt any 02)
   (a) Beam to Column connection in a multi-storeyed structure.
   (b) Connection of North Light Truss to Lattice Girder.
   (c) Beam to Beam connection in a multi-storeyed structure.

SECTION B

3  Discuss the following.
   (a) Hydraulic lift.
   (b) Automatic sprinkler system.

4  Discuss the general planning and design consideration for earthquake resistant architecture. Also elaborate upon the structural safety measures to be adopted.
<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>1(a)</td>
<td>Define Specification. What are correct form of writing specifications-avoiding ambiguity and conflicting statements? <strong>OR</strong> What are standard specifications and uses of standard specifications?</td>
<td>7</td>
</tr>
<tr>
<td>(a')</td>
<td>Write detailed specification of any one item of work of the following: (i) Cement concrete in foundation trenches (ii) Brick work in cement sand mortar in foundation</td>
<td>8</td>
</tr>
<tr>
<td>2(a)</td>
<td>Define estimate and enumerate various types of estimate. <strong>OR</strong> Describe detailed method of estimate</td>
<td>7</td>
</tr>
<tr>
<td>(a')</td>
<td>Estimate the cost of one room (size- 4.5 m x 5.5 m) attached with bath cum W.C. (size 2.5 m x 3.0 m) by plinth area method. Assume plinth area rate =Rs. 23000 per sq. m.</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>Prepare bill of quantity of one room building as shown in Fig. 1 for any three items of work of the following: (i) Earth work in excavation in foundation (ii) First class brick work in 1:6 cement sand mortar in foundation (iii) 2.5 cm thick damp proof course in 1:2:4 c.c. (iv) First class brick work in 1:6 cement sand mortar in super structure (v) 12 mm thick plastering in 1:6 cement sand mortar</td>
<td>5x3=15</td>
</tr>
<tr>
<td>4(a)</td>
<td>Analyze the rate of any one item of work of the following: (Assume suitable rate) (i) Earth work in excavation in foundation (ii) First class brick work in 1:6 cement sand mortar in foundation (iii) 2.5 cm thick flooring in 1:2:4 cement concrete</td>
<td>8</td>
</tr>
<tr>
<td>(b)</td>
<td>Write short notes on the Measurement book and daily labour muster roll</td>
<td>7</td>
</tr>
</tbody>
</table>
Doors
D_1: 1.20 × 2.00 m
D_2: 0.90 × 1.80 m

Windows
W_1: 1.00 × 1.20 m
W_2: 0.75 × 0.90 m

Shelf: 1.00 × 1.50 m

Steps
Treads: 30 cm
Rise: 15 cm
2017-2018
B.ARCHITECTURE (VII-SEMISTER) EXAMINATION
(ARCHITECTURE DESIGN V)
(AR-451N)
Credits: 07
Max Marks: 40
Duration: Six Hours

Note: (i) Neuferts-data and time saver standards are allowed but provision of these is not the responsibility of the department.
(ii) Good drafting shall carry weightage.
(iii) Assume any suitable data wherever necessary.

Design problem

A famous old engineering college of Aligarh having several departments and courses desires to add a modern computer engineering department of repute to run UG, PG and Ph.D. programmes with an intake of 60, 30 and 20 respectively each year in this newly established department. Thinking you as an expert designer of such projects, it appoints you to suggest, guide, supervise and design this aforesaid project with suitable requirements and facilities with modern form and materials. Site is of rectangular shape measuring 30m*45m located on east side of existing building to be joined through its 3.5m wide covered corridor.

For the above project provide the following

1. List of requirements with area chart. 06
2. Site plan of proposed area with landscaping. 06
3. Suitable plans to explain your design. 12
4. Section/sections 04
5. Elevations and/ views 04

Viva shall also be conducted to provide you an opportunity to explain your concept/design. 08
2017-2018
B.TECH/ B.ARCH.(AUTUMN SEMESTER) EXAMINATION
DESIGN OF CONCRETE STRUCTURES - II
(CE - 411)

Max. Marks: 60
Duration: Two Hours

Note: Answer all questions.
Assume suitable data, if not given.
Use of IS-456, IS-3370 and Bridge Manual is permissible

Q.No. Question M.M.

1. Calculate the reinforcement in a three span continuous beam of a typical interior idealized plane frame of a building. The frames are spaced 5.5m apart and in the typical floor 140mm thick continuous slab is cast monolithically with beams. The thickness of floor finish is 40mm. The beam has three equal spans of length 6.1m. The floor is to support imposed load of 5 KN/m² at the service state. The unit weight of the finishing material is 20KN/m³. The materials to be used are M-20 grade concrete mix and HYSD steel of grade Fe-415 for moderate exposure conditions. Use bending moment and shear force coefficients for the continuous beam given in IS-456.

OR

1' (a) Explain the Redistribution of Moment with suitable example? Also discuss the advantages of Redistribution of Moment.

1' (b) Determine the design moments at support and in the mid span region, before and after redistribution of moments of 30%, for a beam AB of span L, carrying a uniformly distributed load, when (i) it is fixed at both ends A and B; (ii) it is fixed at end A and simply supported at B. Draw the bending moment diagrams in each case, and show the points of contra flexures and points of maximum bending moments.

2. Design the following structural components of an Intz type water tank shown in Fig.1, which is supported on an elevated tower comprising of 8 columns and 10m above the ground.
   (i) top ring beam (ii) cylindrical wall
   The depth of foundation is 1 m below ground level. Adopt M-30 grade concrete and Fe-500 TMT steel. The design of the tank should conform to the stresses specified in IS: 3370 and IS: 456.

OR

2' Design the vertical long wall of an open rectangular water tank resting on firm ground having inside plan dimensions of 5m x 3.5m and 2.35m height. A free board of 0.15 m is also provided. Adopt M-25 grade concrete and Fe-415 grade tor steel. The design of the tank should conform to the stresses specified in IS: 3370 and IS: 456.

Contd...
3. Design a slab culvert for a clear span of 5.5 m having a clear roadway 10 m between kerbs for two vehicles of IRC class AA track loading. Draw the neat sketch of reinforcement detailing. Use M-25 grade concrete and Fe-415 grade steel.

4(a) Write Short notes on:
(i) Loss of prestress in pre-tensioning system.
(ii) Merits and demerits of prestressed concrete.

4(b) A beam of 150 mm x 300 mm is prestressed by a force of 250 kN by steel cables located at an eccentricity of 60 mm as shown in Fig.2. Determine the loss of prestress due to creep of concrete for the following data:
\[ \sigma_{ck} = 45 \text{ N/mm}^2 \]
Cables = 6 Nos. -7 mmφ
Creep coefficient = 2
\[ E_c = 200 \text{ kN/mm}^2 \]
\[ E_c = 30190 \text{ N/mm}^2 \]

5. Design the vertical stem of a T-shaped retaining wall for a height of 4 m above the ground level. The top of the earth retained is horizontal. The angle of repose of earth is 30° and its density is 17kN/m³. The safe bearing pressure is 150 kN/m². Use M-25 grade concrete and Fe-500 TMT bars.

OR

5*. Calculate the reinforcement in the waist slab of a waist slab type of a dog-legged staircase for an office building for the following data:

Height between the floor = 3.2 m
Tread T = 270 mm and Riser R = 160 mm
Width of flight = landing width = 1.25 m
Live load = 5.0 kN/m² and Finished load = 0.6 kN/m²
Assume the stairs to be supported on 230 mm thick masonry walls at the outer edges of the landing, parallel to the risers. Use M20 grade concrete and Fe415 grade steel.

FIGURES

![Fig.1](image1)

![Fig.2](image2)

All dimensions are in mm