Q.No.  

1. Draw the following details of any TWO on suitable scale.
   A) Apex detail of Portal Frame Structure.
   B) Plan and sectional detail of Lift (carrying capacity 08 persons).
   C) Gutter detail for North Light Truss.  

2. A steel structure has a spiral fire escape staircase in a well size of 5'-0"x5'-0".  
   Draw the staircase showing all the on site/pre-fabricated joints.  

3. Discuss the various methods to be adopted for making Multi storied Structure 
   Earthquake Resistant.
2014-15
B. Arch. IV yr (VII Semester Examination)
Department of Architecture
Specification, Estimating and Costing (AR-415)
Credits: 04

Maximum Marks: 60

Duration: Three Hours

Note: (i) Answer ALL Questions
(ii) All parts of a question should be attempted in one continuation in one copy
(iii) All questions carry equal marks
(iv) Assume any data if not given

Q. 1 (a) Define and discuss following types of estimates with degree of accuracy and suitability of each type:
(i) Order of Magnitude Estimate
(ii) Approximate Estimate
(iii) Detail Estimate
Also mention degree of accuracy in each type

(b) Mention the basis for fixing the order of magnitude estimate for following structures:
(i) Hospital
(ii) Cold Storage
(iii) Dairy Farm
(iv) Water Tank
(v) Road
(vi) Residential Houses

Q. 2 (a) A plot of size 20m x 12 m has following enclosed spaces:

<table>
<thead>
<tr>
<th>Housing Unit</th>
<th>Size of Units in m (Carpet Area Dimensions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>One Bed Room</td>
<td>4.2x3.6</td>
</tr>
<tr>
<td>One Bed Room</td>
<td>3.6x3.0</td>
</tr>
<tr>
<td>One Hall</td>
<td>7.2x4.8</td>
</tr>
<tr>
<td>One Kitchen</td>
<td>3.6x3</td>
</tr>
<tr>
<td>Two Bathrooms</td>
<td>3x1.5</td>
</tr>
</tbody>
</table>

Rooms have been provided with window as 10% of carpet area. Each room has one door. Bathrooms have two doors. Calculate the approximate quantity of following items:

(i) Total carpet area
(ii) Area of working platform of kitchen
(iii) Interior area of wall for plastering
(iv) Total area of flush doors needed
Q.3 (a) Explain the phrase:
"Estimate is an opinion, Price is a policy and Cost is a fact"

(b) Explain the following types of cost with an example:
   (i) Direct Material
   (ii) Direct Labour
   (iii) Opportunity Cost
   (iv) Cost in Place
   (v) Imputed Cost
   (vi) Replacement Cost

Q.4 (a) What do you understand by following terms
   (i) Analysis of Rate
   (ii) Schedule of Rate
   (iii) Bill of Quantity
   (iv) Quality Assurance

(b) Calculate quantity of materials for R C C water tank of size (4x2x1) m
    and Wall thickness, 10 cm. The tank is open at the top and reinforced with
    0.12% steel both ways in walls as well as in the bottom

OR

Q.4' (a) Explain the term specification. Discuss various types of specifications
    used in Construction industry with example

(b) Write down the specification for Termite Resistant brick work in
    foundation

Q.5 (a) Write down the units of measurement for following items:
   (i) Chaukhat
   (ii) Earth Work
   (iii) ½ Brick wall
   (iv) C C Flooring
   (v) Bar bending
   (vi) One brick wall

(b) Explain the term Title, Right and Interest in context of land

OR

Q.5' (a) Discuss the following with example:
   (i) Item Rate Contract  (ii) Cost Plus Contract  (iii) Lump Sum Contract

(b) What are the various ways of learning of any professional knowledge,
    which learning style you consider best for the learning of quantity
    surveying.
COMMERCIAL COMPLEX

The cost of urban land located in metropolitan cities is touching unbelievable high levels because of population explosion and high demand for commercial spaces. A famous builder having an old plot in commercial area of a metropolitan city, keeping in mind the solid economic gain of a well-designed commercial complex is interested in constructing the same. The proposed commercial complex is to be equipped with all modern facilities to cater the demands of high income society and offices of MNCs.

You as an architect have to design the said commercial complex on site measuring 45 m X 65 m having approach road on two sides, located on a road junction. North is toward road on longer side of the site.

FAR = 2.0
GROUNG COVERAGE = 30%
SET BACK = 4 meters all side

<table>
<thead>
<tr>
<th>DESIGN REQUIREMENTS:</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Shopping area (number of shops and its sizes are to be assumed by the students)</td>
<td>30% of permissible area</td>
</tr>
<tr>
<td>2. Office Area (to be developed in module of suitable size)</td>
<td>70% of permissible area</td>
</tr>
<tr>
<td>3. Toilets (Male and Female), Lift, Staircase, Lobby, Services etc.</td>
<td>As required out of total area allocated for shopping/offices.</td>
</tr>
<tr>
<td>4. Parking</td>
<td>As required</td>
</tr>
</tbody>
</table>

Drawing Requirements:

1. Design concept, area calculations and All plans (1:100) (to be evaluated through viva) 25
2. Elevation/s (1:100) 8
3. Section (1:100) 7
2014-2015
B.ARCH. / B.ENG. (AUTUMN SEMESTER) EXAMINATION
(ARCHITECTURE / ECE ENGINEERING)
DESIGN OF CONCRETE STRUCTURES-II
(CE-411)

Maximum Marks: 60 Credits: 04 Duration: Three Hours

Note: (i) Answer all the questions.
(ii) Assume suitable data, if not given.
(iii) Use of IS codes 456, 1893, 3370 and IRC loading charts are allowed.

Q1. Design a continuous reinforced concrete beam of rectangular section to support a dead load of 10KN/m and a service live load of 15 KN/m over three simply supported spans of 8m each. 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

Q1(a). Obtain the maximum elastic moment diagram (BM envelop) for ultimate limit state before redistribution of moments, and design moment envelop after 30% redistribution of moments for a two span continuous beam ABC, 8m-long, freely supported at A and C, and continuous over the central support B, 4m from A. The beam carries dead load (inclusive of self weight) of 20 kN/m and a uniformly distributed live load of 28 kN/m.

Q1(b). A special reinforced concrete moment resisting frame building with infill panels is situated in Delhi. Height of the building is 10m. The building is resting on medium soil. The base dimensions of building at plinth level is 24m. Determine the design horizontal seismic coefficient for a damping of 5%.

Q2. Design top dome, top ring beam and cylindrical wall of an Intze tank for following data

Central rise of top dome = 1.5 m
Diameter of cylindrical vessel = 12.0 m
Height of cylindrical vessel = 4.5 m
Rise of bottom dome = 1.5 m
Mean diameter of supporting tower = 9.0 m

Contd. - 2.
Q2. Design a rectangular tank having dimensions 5×2.5×2 m. The height of the wall is 2 m. The walls are rigidly jointed at the vertical edges and pin jointed at the base as well as on roof slab, at their horizontal edges. The tank is supported on all sides under the wall. Use M-20 grade of concrete and Fe-415 steel bars. (12)

Q3. Design a slab culvert for a span of 3 m and clear carriage way width of 7.5 m suitable for IRC class “A” loading. Use M-20 grade of concrete and Fe-415 steel bars. (12)

Q4(a) Write Short notes on :

(i) Loss of prestress
(ii) Merits and demerits of prestressed concrete

Q4(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.1. Determine the loss of prestress due to creep of concrete for the following data:

\[ \sigma_{ck} = 45 \text{ N/mm}^2 \]
\[ \text{Cables = 6 Nos. -7 mm } \]
\[ \text{Creep coefficient} = 2 \]
\[ E_s = 200 \text{ kN/mm}^2 \]
\[ E_c = 30190 \text{ N/mm}^2 \]

Q5. Design a waist slab type of a dog-legged staircase for an office building for the following data: (12)

Height between the floor = 3.2 m
Tread T = 270 mm
Riser R = 160 mm
Width of flight = landing width = 1.25 m
Live load = 5.0 kN/m²
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.
Q5'. Design the 'Toe slab of a cantilever retaining wall to retain an earth embankment 4m high above ground level. The density of earth is 18 KN/m$^3$ and its angle of repose is 30°. The embankment is horizontal at top. The safe bearing capacity of the soil may be taken as 100 KN/m$^2$ and the coefficient of friction between soil and concrete is 0.5. Adopt M-20 grade concrete and Fe415 HYSYD bars.

**FIGURES**

![Diagram](image)

**Fig.1**

All dimensions are in mm