B.A.R.C.H. III Year (ODD) SEMESTER EXAMINATION
ARCHITECTURE
ISLAMIC ARCHITECTURE
AR-301

Maximum Marks: 60 Credits: 03 Duration: Two Hours

Answer all the questions.
Assume suitable data if missing.
Neat sketches shall have suitable weightage.

Q.No. | Question | M.M.
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1(a) | Explain the process of understanding any religious architecture especially in the light of its values, socio-political history and technological developments. | [06]
1(b) | Explain basic socio-religious values of Islam which affects Islamic architecture. | [06]
2 | Explain any ONE of the following Islamic architecture style in detail. Moorish architecture. Turkish-Iranian and central Asian architecture. Architecture of china and far-east. | [12]
3 | Explain Mughal architecture in detail with suitable examples of sketches of important buildings and their salient features. | [12]
4 | Explain any ONE of the following Islamic architecture style in detail. Bengal architecture. Gujarat architecture. Golconda and Bijapur architecture. Sikh & Rajput architecture. Pathan dynasty architecture. | [12]
5 | Explain the following Climatic control, Acoustical control. Earthquake resistance. Prominent Islamic arches and domes styles. | [12]
1. Design a landscape scheme for a square of 15m X 15m to be developed in front of a historic library namely Malviya Pustakalaya situated in the core area of the Aligarh City. The design should inculcate the ambience of a public library space. Present your scheme through concept note, landscape plan and a section with proper detailing. Assume suitable scale for the drawings. [12]

2. What is landscape design and what are the elements of landscape design? [07]

3. Differentiate between softscaping and hardscaping and their use in landscape design. [07]

4. Describe any designed Mughal garden in detail with the help of sketches and illustrations. [07]

5. Name any 5 trees majorly found in the Northern India along with their properties and uses. [07]

6. Write a short note on any two:
   a) Landscaping techniques to achieve maximum energy efficiency on the site.
   b) Use of artificial water bodies in landscape design
   c) Heat Island Effect
Answer any FOUR questions. Question 1. is compulsory. All questions carry equal marks. Draw sketches and illustration for supporting your answers.

Q.1 (a) Discuss the psychological impact of colour scheme in interior areas. (2)
(b) Draw the plan, sectional elevations and other necessary details by applying any colour scheme along the concept note of any one of the following:
   i) Living room   ii) Kitchen   iii) Architect’s office

Q.2 (a) Write the design process in brief for any interior design project. (5)
(b) List and Discuss materials and finishes used in interior spaces based on the market survey which can apply in your live project.

Q.3 (a) Write the principles of interior design and elaborate them with a live project by your memory. (5)
(b) Sketch or illustrate any interior space from your memory and write the interior design elements used in that space.

Q.4 (a) What is ergonomics, and write the important ergonomic considerations that determine any product as a good design? (4)
(b) Sketch or illustrate any bad ergonomic product and give solutions for the same.

Q.5 (a) What is interior design and Write the scope of interior design in the practical field. (5)
(b) Discuss the role and workflow of interior designer with an architect in the execution of a project.

Q.6 (a) What is the working triangle for designing kitchen space? Discuss the types of kitchens briefly. (4)
(b) Describe the planning concepts of part to whole by taking any interior with the help of suitable sketches. (6)
COMMUNITY CENTRE

The accompanying sketch indicates the site for a proposed COMMITY CENTRE to be built within a Housing Complex. The objective of the project is to develop facilities, which would accommodate different community activities and encourage social mixing for the residence of housing complex.

Design the above COMMUNITY CENTER with the following requirements:

1. Multipurpose hall with stage and back stage and lounge facilities for 200 agglomeration capacity, capable of extending beyond by adapting flexible enclosing units. 300 Sq. m.
2. Open lawn for conducting open air party. 400 Sq. m.
3. Children’s activity region. 150 Sq. m.
4. Badminton or Tennis court
5. Food court 50 Sq. m.
6. Care taker’s office 100 Sq. m.
7. Parking (Two wheeler and Four wheeler)

The above mentioned requirements, indicated by the client, are indicative and not exhaustive. The designer may add service space and/or additional spaces for other functions as deemed appropriate.

DRAWING REQUIREMENT:

- Concept and viva
- Site Plan 10
- Floor Plan 15
- Elevations/Views 10

Notes: Permissible FAR=1.5, Ground Coverage 35%, Set Back: Front=25m, Side and Rear=12m

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Maximum Marks: 60

Duration: Two Hours

Answer all the questions. Assume suitable data if missing. Notations used have their usual meaning.
Use of IS: 456-2000 Code is allowed and list the relevant clauses of the code while solving the problem.
Only design charts of SP16 attached with the paper are allowed.

Q.No.

1 (a) Give three reasons for providing cover to tension steel in a R.C beam

1 (b) Determine the minimum effective depth required and the corresponding area of tension reinforcement for a rectangular beam having a width of 250\text{mm} to resist an ultimate moment of 200\text{kNm}. Assume \text{Fe415} grade steel and \text{M20} grade concrete.

2 (a) Prove the following expression, \( L_d = \frac{0.87 \sigma_s \phi}{4 \tau_{bd}} \) where, \( L_d \) = development length; \( \sigma_s \) = stress in steel; \( \phi \) = diameter of bar and \( \tau_{bd} \) is bond stress.

2 (b) A beam with 4\#32\text{mm} diameter bars as tension steel has two bars symmetrically bent at the ends of beam at 45°. Find the vertical stirrups for resistance against shear failure at the ends if the factored shear force at the critical section is 400 \text{kN}. Assume \( b=300\text{mm}, d=550\text{mm} \) and grade of concrete and steel as \text{M25} and \text{Fe415} respectively.

\text{OR}

2' (b) Determine the depth of a RC slab 6.3m×4.5m with effective span to two adjacent edges continuous over support using Limit State of Serviceability and Collapse criteria and determine the area of steel in shorter direction. The design LL is 2.5\text{kN/m}². A 37.5\text{mm} thick floor finish is provided on the slab. Exposure condition of slab to environment can be classified as mild. Assume \text{M20} concrete mix and \text{Fe415} grade steel. Checks are not required.

3(a) Explain the modes of failure of column.

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3(b) Design an axially loaded tied column $400\text{mm} \times 400\text{mm}$ pinned at both ends with an unsupported length of $3\text{m}$ for carrying a factored axial load of $2300\text{kN}$. **Justify the use of formula** for design of the column. Assume $M20$ mix concrete and $Fe415$ grade steel. Detail the column.

**OR**

3(a) Explain the function of transverse ties in a RC column? What happens when ties are not provided?

3'(b) A reinforced concrete column of circular cross section with unsupported length of $5.5 \text{m}$ is to support an axial load of $1800 \text{kN}$ (working) along with a factored bending moment of $150 \text{kNm}$. Design a suitable cross section of column with longitudinal and transverse steel. Use the chart as attached herewith. Assume $M25$ mix concrete and $Fe415$ grade steel.

4 Determine the depth, area of steel in an isolated column footing for a column $400 \times 400 \text{mm}$ reinforced with 8 bars of $20 \text{mm dia.}$ and carrying a service load of $1500 \text{kN}$. Assume safe bearing capacity of soil at required depth as $150 \text{kN/m}^2$, angle of repose for soil is $30^\circ$ and density as $17 \text{kN/m}^3$. Also check for punching shear. Use $M20$ concrete mix and $Fe415$ grade steel.
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2018-19
III YEAR B. TECH. V SEMESTER EXAMINATION
CIVIL AND ARCHITECTURE
SOIL MECHANICS
CE-312

Maximum Marks: 60

Answer all the questions.
Assume suitable data, if missing.
Notations used have their usual meaning.

Q. No.  Questions                                                                 M.M.
1(a)  Enumerate various methods for determining the moisture content of soil. Discuss any  [7]
      one of them in detail.
1(b)  In a field exploration, a soil sample was collected in a sampling tube of internal  [8]
      diameter 5.0cm below water table. The length of the extracted sample was 10.5cm and
      its weight was 450g. If $G = 2.70$ and the weight of the dried sample is 356g. Find the
      porosity, void ratio, degree of saturation, and dry density of the sample.

OR

1'(a)  Differentiate between standard and modified Proctor’s compaction tests? Discuss in  [7]
      brief about the various factors affecting compaction of soil.
1'(b)  Determine the stresses below a corner and center of a $3 \times 4m$ footing that carries a  [8]
      uniformly distributed load of 100kN/m$^2$. The stresses are required at 6m depth below
      the base of the footing.

2(a)  Differentiate between seepage velocity and discharge velocity. Derive the relationship  [7]
      between them.

If seepage velocity is given as 0.0023cm/s and void ratio of 55%, determine its
      discharge velocity.
2(b)  A sample of sand, 5cm in radius and 20cm long, has a void ratio of 60% in a constant  [8]
      head apparatus. The total head was kept constant at 30cm and the amount of water
      collected in 5s was 40cm$^3$. The test temperature was 20$^\circ$C. Calculate the hydraulic
      conductivity and the seepage velocity.

3(a)  Discuss in detail about Height of Solids and Change in Voids Ratio methods for  [7]
      determining the equilibrium voids ratio.
3(b)  The voids ratio of clay sample A decreased from 0.675 to 0.610 under a change in
      pressure from 100 to 200kN/m$^2$. The voids ratio of another sample B decreased from
      0.615 to 0.555 under the same increment of pressure. The thickness of sample A was
5cm

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2.0 times that of B. The time taken for 60% consolidation was 3 times more for sample A than for B. What is the ratio of coefficient of permeability of sample A to that of B.

4(a) Discuss Mohr-Coulomb failure criterion in terms of total stress and effective stress parameters. Draw Mohr Circles for c, c - φ, and φ - type of soils.

4(b) Derive the relationship between principal stresses (σ₁ and σ₃) and shear strength parameters (c and φ).

OR

4'(a) An unconfined compression test was carried out on a saturated clay sample. The maximum load this sample sustained was 127N and the vertical displacement was 0.8 mm. The size of the sample was 38mm diameter 76mm long. Determine the undrained shear strength.

4'(b) Enumerate different type of laboratory shear strength tests. Explain Triaxial test in detail.