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***B.Arch. Degree III Semester Regular Examination
November 2022***

**AR 1302 BUILDING MATERIALS AND CONSTRUCTION III
(2021 Scheme)**

Time: 4 Hours

Maximum Marks: 100

**PART A
(Answer ALL questions)**

(8 × 5 = 40)

- I. Write short notes on the following:
- Physical properties of soil.
 - Water-cement ratio.
 - Properties and uses of TMT bars.
 - Alloys of copper.
 - Factors involved in staircase design.
 - Jack-arch floor.
 - One-way and two-way slabs.
 - Types of formwork.

PART B

(4 × 10 = 40)

- II. Define bearing capacity of soil. Explain the methods to improve bearing capacity of a soil sample.

OR

- III. Explain briefly the mix proportioning and batching of concrete.

- IV. Explain the various forms of steel sections available in the market for various structural applications in buildings.

OR

- V. What are the properties of aluminum? Explain the various applications of aluminum as a building material.

- VI. Explain with neat sketches the different types of concrete stairs used in building.

OR

- VII. Explain any five flooring materials. What are the factors considered for the selection of flooring and flooring materials?

- VIII. With neat sketches, define the parts of an RCC framed structure. What are the advantages of framed structures?

OR

- IX. Explain with neat sketches the different types of lintels based on the materials.

(P.T.O.)

PART C

(1 × 20 = 20)

- X. Draw to a suitable scale, the plan and section of a dog-legged RCC staircase for a residential building. Floor height = 330 cm. Assume any necessary details required.

OR

- XI. Draw to a suitable scale, plan and section of a combined column footing for a column size of 30 cm × 30 cm at a center to center spacing of 500 cm. Assume all other details required.

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***B.Arch. Degree III Semester Regular Examination
November 2022***

**AR 1303 HISTORY OF ARCHITECTURE III:
INDIAN ARCHITECTURE - ANCIENT TO MEDIEVAL PERIOD
(2021 Scheme)**

Time: 3 Hours

Maximum Marks: 100

(Instructions: All answers are to be supplemented with relevant sketches)

**PART A
(Answer ALL questions)**

(8 × 5 = 40)

- I. Write short notes on the following:
- Vastu Purusha Mandala.
 - Vedic village.
 - Architecture of Buddhist Stupas in India.
 - Lomas Rishi in Barabar Caves.
 - Early Chalukyan Temples at Aihole.
 - Virupaksha temple at Pattadakal.
 - Temple architecture of the Later Chalukyas in Belur and Halebid.
 - Dravidian style of temple architecture.

PART B

(4 × 15 = 60)

- II. How was architecture and lifestyle of people of the Vedic period in stark contrast when compared to their predecessors from the Indus Valley?
- OR**
- III. What were the different types of layouts used for planning settlements during the Vedic times?
- IV. What were the contributions of Emperor 'Ashoka the Great' towards Ancient Indian architecture and the spread of Buddhism as a religion in India?
- OR**
- V. What are the different schools of Buddhism and Jainism prevalent in India? How are their philosophies reflected through their architecture?
- VI. Explain how the Hindu temples evolved from basic single-room shrines into huge multi-functional complexes and major urban centers in India.
- OR**
- VII. What were the different schools of temple architecture under the Nagara style? Explain any three.
- VIII. What are the contributions of the Pallava Kings in the development of Dravidian architecture?
- OR**
- IX. Why is the Brihadiswara temple at Thanjavur considered to be the greatest architectural achievement of the 'Imperial Cholas'?

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AR 1304 THEORY OF STRUCTURES II - STRUCTURAL ANALYSIS (2021 Scheme)

Time: 3 Hours

Maximum Marks: 100

PART A (Answer ALL questions)

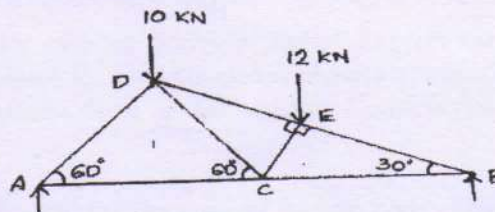
(8 × 5 = 40)

- I. Write short notes on:
- List out the assumptions in Theory of Simple Bending.
 - Explain the concept of Beams of Uniform Strength.
 - A circular beam of 100 mm diameter is subjected to a shear force of 30 kN. Calculate the value of maximum shear stress and sketch the variation of shear stress along the depth of beam.
 - Explain method of section for the analysis of truss.
 - Define determinate and indeterminate beams.
 - Explain the concept of deflection of beams.
 - Explain the classification of column based on slenderness ratio.
 - Give notes on Effective length of column.

PART B

(4 × 15 = 60)

- II. A simply supported beam of 5 m span carries udl of 10 kN/m and a point load of 20 kN at the Centre of the span. If the permissible stress is limited to 150 MPa, determine the dimensions of rectangular section taking width equal to half the depth of beam.
- OR
- III. A water main 500 mm internal diameter and 20 mm thick is running full. The water main is of cast iron and is supported at two points 10 m apart. Find the maximum stress in the metal. The cast iron and water weigh 72000 N/m³ and 10000 N/m³ respectively.
- IV. A truss of span 5 m is loaded as shown in figure. Find the reactions and forces in the members of the truss.



OR

- V. A hollow shaft having an inside diameter 60% of its outside diameter is to replace a solid shaft transmitting same power at the same speed. Calculate the percentage saving in material, if the material to be used is also the same.

(P.T.O.)

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- VI. A beam of length 6 m is simply supported at its ends and carries two point loads of 48 kN and 40 kN at a distance of 1 m and 3 m respectively from the left support. Find:
- deflection under each load.
 - Point at which maximum deflection occurs.
 - maximum deflection by Macaulay's method.

OR

- VII. Derive the equation for slope and deflection for a simply supported beam carrying an eccentric point load by Conjugate beam method.

- VIII. A hollow mild steel tube 6 m long, 4 cm internal diameter and 5 mm thick is used as a strut with both ends hinged. Find the crippling load and safe load taking factor of safety as 3. Take $E = 2 \times 10^5 \text{ N/mm}^2$.

OR

- IX. A simply supported beam of length 4 m is subjected to udl of 30 kN/m over the whole span and deflects 15 mm at the centre. Determine the crippling load when this beam is used as a column with the following conditions:
- One end fixed and other end hinged.
 - Both the ends hinged.

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***B.Arch. Degree III Semester Regular Examination
November 2022***

**AR 1306 CLIMATE AND ARCHITECTURE
(2021 Scheme)**

Time: 3 Hours

Maximum Marks: 100

(All answers are to be supported with relevant sketches)

**PART A
(Answer ALL questions)**

(8 × 5 = 40)

- I. Write short note on the following
- Summer Solstice and Winter Solstice.
 - Landscape elements on Climate and Architecture.
 - Warm humid equatorial climate.
 - Precipitation.
 - R Value and U Value.
 - Olgyay's Bioclimatic chart.
 - Types of reflection.
 - Spectral sensitivity of eye.

PART B

(4 × 15 = 60)

- II. How does the tilt of earth axis affect climate? Explain with a neat sketch the Tilt of earth's axis and its rotation
- OR**
- III. Explain and draw the global pattern of thermal air movements? How does the Coriolis effect Influence the direction of trade winds on Earth?
- IV. What are the elements of Climate? Explain five major elements of climate and specify the units and the tool with which they are measured and recorded.
- OR**
- V. What are the major climatic zones in India? Explain the Characteristic features of the climate in any two global climate zones. Discuss through the following aspects- form and Planning, Construction and Material selection.
- VI. Describe briefly the thermal balance of human body. Draw in detail the human body's heat exchange and explain the subjective variables that influence the thermal comfort of a person.
- OR**
- VII. What are the thermal comforts Indices? Discuss in detail with neat diagram of the following thermal comfort indices that scale comfort and issues in scaling comfort
- Effective Temperature (ET)
 - Corrected Effective Temperature (CET).

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VIII. What are the three basic types of shading devices? Explain and illustrate in detail the shading devices and how it affect the thermal comfort in a built environment.

OR

IX. Enumerate with illustrations the various position and controls of openings used in buildings to achieve thermal comfort.

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***B.Arch. Degree III Semester Regular Examination
November 2022***

**AR 1307 SURVEYING AND LEVELLING
(2021 Scheme)**

Time: 3 Hours

Maximum Marks: 100

**PART A
(Answer ALL questions)**

(8 × 5 = 40)

- I. (a) Explain briefly the principles of surveying.
 (b) Explain reciprocal ranging.
 (c) Write a note on field book.
 (d) What factors should be considered in deciding the stations of chain survey?
 (e) What are the temporary and permanent adjustment of theodolite?
 (f) What are the advantages of Auto-level?
 (g) List the precautions to be taken while using a total station.
 (h) Write short note on contour map characteristics.

PART B

(4 × 15 = 60)

- II. What are the classification of survey?
OR
- III. What are the Obstacles in chaining?
- IV. Explain the method of measuring a horizontal angle by repetition method using theodolite. What are the various sources of errors in theodolite surveying?
OR
- V. Explain the three point problem in plane table surveying.
- VI. What are the different types of levelling staff? State the merits and demerits of each.
OR
- VII. The following readings were taken with a dumpy level, the instrument was shifted after taking 3rd, 6th and 8th reading. Rule out a page of level field book and enter the readings. Also calculate the reduced levels of each station. Use Rise and fall method. Assume the initial R.L as 100 m, readings are 2.228, 1.606, 0.988, 2.090, 2.864, 1.262, 0.602, 1.982, 1.044 and 2.684 meters.
- VIII. Explain Total station. What are the advantages of total station over other surveying instruments?
OR
- IX. Explain the various types of EDM Instruments.
