1. Write in short about the following terms: (any four)  
   (a) Simplex pile  
   (b) Toughened glass  
   (c) Raft foundation  
   (d) Intrados  
   (e) Skewback  
   (f) Tool Steel  

   [4X2.5=10]

2. What are the various types of non-ferrous metals used in building construction?  
   Write in detail about their characteristics and uses.  

   [10]

   OR

2'. a) What are the various types of glass used in buildings? Write in detail about their properties and uses.  

   [10]

3. Draw the following (any two):  
   (a) Mezo acuto arch with support details  
   (b) Draw the fixing detail of a steel and glass window to the lintel in a 900 wide opening.  
   (c) Timber Grillage foundation.  

   [2x5=10]

4. (a) What are the precautions to be taken in the construction of a cavity wall?  
    (b) Draw the sectional detail of a parapet in a cavity wall.  

   (4)  

   (6)
Answer all the questions.
Assume suitable data if missing.
Notations used have their usual meaning.

Q.No. | Question |
--- | --- |
1 (a) | Draw the layout of a water supply connection for a residential building and briefly explain the function of each component. [06] |
1 (b) | Describe the different water demands. Briefly explain how the variations in hourly water demand are met out? [09] |
2 (a) | Draw water treatment flow sheet for surface and ground water sources of water supply. Explain the process of coagulation and flocculation process. [05] |
2 (b) | Differentiate between direct pumping and combined pumping and gravity system of water distribution. Water is to be supplied to a locality at the rate of 135 lpcd for a population of 50 thousand peoples through pumping from a reservoir. The difference in elevation between the water source and the delivery point is 35 m. The total length of the pipe is around 1200 m. If the velocity in the pipe is to be assumed as 1.4 m/s find the diameter of the pipe and the brake horse power of the pump required to supply the desired amount of water. Take the value of friction factor as 0.02 and efficiency of pump as 60%. [10] |

OR

2' (a) | Water is supplied to a town from a pump house (A) as well as from a elevated reservoir (C) 45 m above M.S.L. to a locality (B). The pump pressure was 550 KPa and the desired water pressure at load centre (B) is 220 KPa. The average elevation of pump at A was 3.0 m above M.S.L and that of load centre was 5.0 m above M.S.L. [08] |
M.S.L. Calculate the total discharge of water reaching at B. The length and diameter of pipe from A to B are 1000 m and 200 mm respectively while that from C to B was 900 m and 150 mm respectively.

2' (b) What are the different population forecasting methods? Briefly explain any two of them.

3 (a) With the help of sketches explain the functioning of any two types of water taps

OR

3' (a) Briefly explain the aeration and water softening processes of water treatment.

3 (b) Draw sewage treatment flowsheet and briefly explain the purpose of various primary treatment units.

4 (a) Differentiate between conservancy and water carriage systems of sanitation

4 (b) What is the objective of sewage pumping station?

4 (c) With the help of sketch explain the functioning of Activated Sludge Process

4 (d) Briefly describe the objective of wastewater disinfection. Explain breakpoint chlorination.
2018-2019
B.Arch. (Autumn Semester) Examination
Climate & Design

ARC-2030
Maximum Marks: 60
Credits: 4
Duration: Two Hours

Answer any 5 questions which carry equal marks. Question-1 is Compulsory. Assume relevant data if necessary. Draw neat sketches/diagrams to support your answers.

1. Define briefly the following terms (any 6)
   a. Time lag & Decrement Factor
   b. Earth’s thermal balance
   c. Effective Temperature
   d. Sol Air Temperature & Solar Gain Factor
   e. Angle of Incidence
   f. Shadow Angles
   g. Color Rendering Index & Correlated Color Temperature
   h. Temperature Inversion

2. What is the role of study of Climatology in Architecture? Explain in detail its impact and importance on buildings.

3. Explain Different types of Wind on Earth.

OR

3’. Explain salient features of Warm Humid Climate and Tropical Upland Climate.


5. Explain the method of preparation of Sun-path diagram and its uses in designing of various types of louvers.


7. Explain Heat Exchange Processes? Calculate Heat Gain/Loss to provide mechanical installation of required size using following data-

   Room size of 10 m X 10 m & 4 m high with an Outdoor Temperature (-2°C) is located on an intermediate floor of a large building. It has one wall exposed to south direction and other walls adjoin rooms at same indoor temperature of 22°C. A window is placed on south wall with dimension 8 m X 2.5 m. Fluorescent tubes (8 # 25 Watts) are used continuously to light the interior by 8 draftsmen for drawing works.

   U value of exposed wall with plaster = 2.0 W/sqm°C & Glass = 4.0 W/sqm°C

   Ventilation rate = 5 air changes per hour

   Incident Solar Radiation I = 300 W/sqm

   Absorbance of surfaces a = 0.5 & Solar Gain Factor for windows θ = 0.5
2018-19
B.TECH. (AUTUMN SEMESTER) EXAMINATION
CIVIL ENGINEERING
WATER SUPPLY AND SANITATION
ARC 2050

Maximum Marks: 60
Credits: 03
Duration: Two Hours

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

Q.No. Question M.M.
1 (a) Water is to be supplied to a locality at the rate of 135 lpcd for a population of 75 [06]
thousand peoples through pumping from a reservoir. The difference in elevation
between the water source and the delivery point is 35 m. The total length of the pipe
is around 1200 m. If the velocity in the pipe is to be assumed as 1.4 m/s find the
diameter of the pipe and the brake horse power of the pump required to supply the
desired amount of water. Take the value of friction factor as 0.02 and efficiency of
pump as 60%.
1 (b) Draw the water treatment flowsheets for surface and subsurface water. [04]
1 (c) Explain the process of coagulation and flocculation in water treatment. [05]

OR
1’ Discuss the different physical, chemical and biological water quality parameters. [15]

2 (a) Water is supplied to a town from a pump house (A) as well as from an elevated
reservoir (C) 43 m above M.S.L. to a locality (B). The pump pressure was 500 KPa
and the desired water pressure at load centre (B) is 200 KPa. The average elevation
of pump at A was 3.0 m above M.S.L and that of load centre was 5.0 m above
M.S.L. Calculate the total discharge of water reaching at B. The length and diameter
of pipe from A to B are 900 m and 200 mm respectively while that from C to B was
1000 m and 180 mm respectively.

2 (b) What are the chemical equations involved in lime soda process for hardness [10]
removal. Water defined by following characteristics is to be softened by Lime soda process. Calculate the amount of lime and soda required for the treatment of 5 MLD of water assume purity of lime as 70% and that of soda ash as 80%.

\[
\begin{align*}
\text{Ca}^{++} &= 50 \text{ mg/L} \\
\text{Mg}^{++} &= 36 \text{ mg/L} \\
\text{Na}^+ &= 23 \text{ mg/L} \\
\text{HCO}_3^- &= 183 \text{ mg/L} \\
\text{SO}_4^- &= 96 \text{ mg/L} \\
\text{Cl}^- &= 50 \text{ mg/L}
\end{align*}
\]

3 (a) Briefly describe wastewater collection systems and explain the necessity of sewage pumping system

3 (b) A 500 mm sewer was laid to such a slope that the velocity in sewer was 1.3 m/s when the sewer was flowing at a depth of 230 mm. Find the slope at which the sewer was laid. Use attached Nomograph and partial flow diagram.

3 (c) Differentiate between separate and combined sewerage systems.

4. Answer any three of the following:

(i) Types of traps
(ii) Disinfection process
(iii) Septic Tank
(iv) Different types of water taps
(v) Arithmetic increase and geometric increase methods of population forecasting.

Contd... 3
1. Give a detailed account of the architecture and town planning of the Indus Valley Civilization. (15)

Or

Write short notes on any Two of the following: (7.5x2)

a) Impact of religion on the development of exclusive style of architecture
b) ‘Great Bath’ and its utility in Harappan Civilization
c) Sanitation technique of Indus Valley Civilization

2. Describe the characteristic features of the Buddhist architecture in India. Do you agree that it was largely flourished during Mauryan Period? (15)

3. Examine the specific features of the evolution of the temple architecture with special reference to the ‘Nagara Style’? (15)

4. Define the ‘Dravida Style’ and its salient features with examples. (15)

Or

Write short notes on any Two of the following: (7.5x2)

a) Pagoda- a Buddhist architecture
b) Stupa at Sanchi
c) Development of architecture in Burma with example
Write in short about the following terms: (any four) [4x2.5=10]
(a) McArthur pile
(b) Glasswool
(c) Combined footing foundation
(d) Toughened glass
(e) Haunch
(f) Brass

What are the various types of ferrous metals used in building construction? Write in detail about their characteristics and uses. [10]

OR

What is the significance of sound insulation in buildings? Explain the methods employed and materials used. [10]

Draw the following (any two): [2x5=10]
(a) Three-centered arch with support details
(b) Draw the fixing detail of a steel and glass window in 1000 wide opening.
(c) Simplex pile.

Write about the commercial forms of plastics and fibres and their uses? (5)
(b) Draw the sectional detail of a lintel in a cavity wall. (5)
STUDENTS' HOBBY CLUB

The authorities of a newly established university located in NOIDA wants to construct a “Students' Hobby Club” where the students can develop their creative talent. The site measuring 40m X 65 m having approach road towards south on shorter side is located within the campus of university. You are requested to design the said club with following design requirements:-

**Design Requirements:-**

1. Office
2. Entrance Lobby
3. Officer Incharge Rm. (with attached toilet)
4. Store
5. Hall for Painting/Photography/Graphics design
6. Hall for Sculpture Making
7. Hall of Technology (Electronics, Robotics, Computer etc.)
8. Hall for Music
9. Toilet for male and female
10. Snacks Counter
11. Parking for 2 cars 15 two wheelers

**Drawings Requirements:-**

- All Plans (1:100 scale) and viva
- Elevations
- Sections

Marks

<table>
<thead>
<tr>
<th>Item</th>
<th>Details</th>
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<tr>
<td>Office</td>
<td>30 sq. m.</td>
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<td>Entrance Lobby</td>
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<tr>
<td>Officer Incharge Rm. (with attached toilet)</td>
<td>25 sq m. (including toilet)</td>
<td>07</td>
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<tr>
<td>Store</td>
<td>25 sq m.</td>
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<tr>
<td>Hall for Painting/Photography/Graphics design</td>
<td>75 sq. m.</td>
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<td>Hall for Sculpture Making</td>
<td>75 sq. m.</td>
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<tr>
<td>Hall of Technology (Electronics, Robotics, Computer etc.)</td>
<td>75 sq. m.</td>
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<td>Hall for Music</td>
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<td>Snacks Counter</td>
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Marks