BE Semester- V (CIVIL ENGINEERING) Question Bank

(HYDROLOGY AND WATER RESOURCES ENGINEERING)

All questions carry equal marks (10 marks)

<table>
<tr><td>Q.1</td><td>Explain “Hydrological cycle” with neat sketch.</td></tr>
<tr><td>Q.2</td><td>Give definitions:
Hydrology, Precipitation Evapo transpiration, Run off, Interception</td></tr>
<tr><td>Q.3</td><td>Discuss the application Of hydrology in practice</td></tr>
<tr><td>Q.4</td><td>Explain with sketch non-automatic type of rain gauge. (Symon’s rain gauge)</td></tr>
<tr><td>Q.5</td><td>Enlist different recording type of rain gauges and explain any one of type rain gauge with suitable sketch in brief.</td></tr>
<tr><td>Q.6</td><td>Explain the following methods for computing average rainfall over a basin.
• Arithmetic average method
• Thiesson’s polygon method
• Isohyetal method</td></tr>
<tr><td>Q.7</td><td>How to determine statically the optimum number required to be installed in a given catchment?</td></tr>
<tr><td>Q.8</td><td>How to estimate the missing precipitation record of any rain gauge station? Discuss various methods for it in brief.</td></tr>
<tr><td>Q.9</td><td>Give short note on:
• Depth area duration curve
• Double mass curve</td></tr>
<tr><td>Q.10</td><td>Define the term “Evaporation”. Describe the factors affecting for evaporation losses.</td></tr>
<tr><td>Q.11</td><td>Discuss various methods of measurement of Evaporation.</td></tr>
<tr><td>Q.12</td><td>Describe briefly the various measures to reduce loss of water due to evaporation in reservoir.</td></tr>
<tr><td>Q.13</td><td>Write short note on “Evaporation losses from reservoir.”</td></tr>
<tr><td>Q.14</td><td>Define the term “Infiltration”. Describe the factors affecting for infiltration rates.</td></tr>
<tr><td>Q.15</td><td>Explain the following terms in brief:
• Infiltration capacity
• Infiltration rate
• Infiltration indices (w-index and ϕ-index)</td></tr>
<tr><td>Q.16</td><td>The infiltration capacities of an area at different intervals of time are indicated below. Find an equation for the infiltration capacity in the exponential form.

<table>
<tr><td>Time (hrs)</td><td>0</td><td>0.25</td><td>0.50</td><td>0.75</td><td>1.00</td><td>1.25</td><td>1.50</td><td>1.75</td><td>2.00</td></tr>
<tr><td>Infiltration capacity (cm/hr)</td><td>10.5</td><td>5.65</td><td>3.20</td><td>2.18</td><td>1.50</td><td>1.25</td><td>1.10</td><td>1.0</td><td>1.0</td></tr>
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Q.17 The rain fall recorded at the various rain gauge stations are as follows.

Rain gauge station number	Precipitation in mm
1	35
2	38
3	41
4	45
5	47
6	50
7	52
8	55

Determine the average rainfall over the catchment by different method.

Q.18 Determine optimum number of rain gauges in catchment area from following data.

- No. of existing rain gauge = 7
- Mean annual rain fall at the gauges are 1010, 980,900,870, 850, 800, 700 mm.
- Permissible error = 8 %

Q.19 A rain gauge recorded the accumulated rain fall during the storm. Draw the mass rain fall curve and hyetograph.

Time (AM)	8:00	8:05	8:10	8:15	8:20	8:25	8:30
Accumulated rain fall (mm)	0	2	3	6	12	18	20

Q.20 The rain gauge station X was in operative for a part of a month during storm occurred. The storm rainfall recorded at the three surrounding stations A, B, and C was 75, 55, and 85 mm respectively. If the average annual rainfall of the stations A, B, C, and X are 780, 660,850 and 700 mm respectively. Estimate the storm rainfall of station X.

Q.21 Explain Gumbel's method for flood frequency analysis

Q.22 Discuss reservoirs routing by Modified pulls method.

Q.23 Estimated flood peaks for two return periods for a river is given below. Determine flood discharge in the river will have a return period of 1000 years.

Return period (Years)	Peak flood (m^3/s)
100	430
50	390

Q.24 A 25 cm diameter well penetrates 20m below water table. After 1 day pumping at a rate of 4600 litre/minutes. The water level in attest well at 110m is lowered by 0.7m and test well at 40 m away drawdown is 1.25 m. What is the transmissibility of aquifer?

Q.25 Explain the various factors which affect the run-off from basin.

<table>
<tr><td>Q.26</td><td>Derive Theims formula for unconfined aquifer.</td></tr>
<tr><td>Q.27</td><td>Describe flood forecasting and warning methods.</td></tr>
<tr><td>Q.28</td><td>Unit hydrograph ordinates of 4 hour are given below. Find out ordinates of 8 hour unit hydrograph.

<table><tr><td>Time (hr)</td><td>0</td><td>4</td><td>8</td><td>12</td><td>16</td><td>20</td><td>24</td><td>28</td><td>32</td><td>36</td></tr><tr><td>U.H.O.</td><td>0</td><td>17</td><td>28</td><td>42</td><td>72</td><td>60</td><td>47</td><td>32</td><td>15</td><td>0</td></tr></table></td></tr>
<tr><td>Q.29</td><td>Explain the following terms:
Depression, Infiltration, Hyetograph, Frequency of rainfall, Intensity of rainfall</td></tr>
<tr><td>Q.30</td><td>Explain the terms:
Aquifer, Artisan well, Perched Aquifer, Darcy’s law, Confined Aquifer</td></tr>
<tr><td>Q.31</td><td>What is unit hydrograph? What are the limitations of unit hydrograph?</td></tr>
<tr><td>Q.32</td><td>Explain S-curve hydrograph.</td></tr>
<tr><td>Q.33</td><td>Explain the various methods of flood control in brief.</td></tr>
<tr><td>Q.34</td><td>The peak values of the floods from the year 1941 to 1955 are 4000,5400,7000,4600,3800,5800,4900,7800,6400,5300,4700,5200,10000 and 5200 cumecs. Estimate the magnitude of flood having frequency equal to (i) 100 years, (ii) 300 years. The ȳn = 0.5128 and Sn=1.0206.</td></tr>
<tr><td>Q.35</td><td>Write short note on Darcy’s law for measuring velocity of ground water flow.</td></tr>
<tr><td>Q.36</td><td>Write short note on permeability, transmissibility and their relationship.</td></tr>
<tr><td>Q.37</td><td>Explain briefly common used evaporemeter.</td></tr>
<tr><td>Q.38</td><td>Explain different types of precipitation.</td></tr>
<tr><td>Q.39</td><td>Explain with neat sketch the construction and use of “tipping bucket type recording gauge.”</td></tr>
<tr><td>Q.40</td><td>Explain with neat sketch the construction and use of “weighing bucket type recording gauge.”</td></tr>
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