Water Resources Engineering, BUET

M.Sc. Admission Test, 2015

- True False + Fill in the Blanks + MCQ = 20 marks.

  (Answer all the question & each question is for 5 marks.)

1. Prove that the pressure at a point inside at rest is same in all directions.
2. Sketch the possible flow profiles in the following combination of slopes:
   a) Mild slope – Milder slope
   b) Milder slope – Steeper slope
   c) Steeper slope – Mild slope
   d) Horizontal slope - Vertical slope
3. Define Specific energy. From dimentionless specific energy curve for rectangular channel, find Yc.
4. Define Froude number. A rectangular channel has a bottom width of 10 m and depth of the flow is 1 m. Discharge of the channel is 2.6 m/s. Determine the state of flow.
5. The pick of a flood hydrograph due to a 3-h duration isolated storm in a catchment is 270 m^3/s. The total depth of rainfall is 5.9 cm. Assume average infiltration loss of 0.3 cm/h and a constant base flow of 20 m^3/s. Estimate the peak of the 3-h unit hydrograph of this catchment, if the area of the catchment is 567 km^2. Determine the base width of the 3-h unit hydrograph by assuming it to be triangular is shape.
6. A bridge has an expected life of 25 years and is designed for a flood magnitude of return period 100 year. What is the rise of this hydrologic design? If a 10% risk is acceptable, what return period will have to be adopted?
7. Find the vapor pressure deficit from the following data. Maximum temperature of the day 35°C, minimum 11°C, dew point temperature 9.5°C, Temperature at 8 am is 12.5°C.
8. If the concentration of Na, Ca, and Mg in a water sample are 345, 60, 18 mg/l respectively find the SAR value.
9. A soil has a field capacity of 25%, Permanent wilting point of 15% and specific weight 14.7 KN/m^3. If the root zone depth of the grown crop is 90 cm, find out its available moisture holding capacity.
10. Find out the discharge through a sand column of length of 20 cm and diameter of 5 cm. Take permeability, k of sand 75 m/day and head loss during the flow through sand column is 2 cm.