MIZORAM PUBLIC SERVICE COMMISSION

Departmental Examinations for Junior Grade of M.E.S. (AE/SDO)
under Power & Electricity Department,
Government of Mizoram, July, 2022.

ENGINEERING PAPER – I
CIVIL WING

Time Allowed : 3 hours   FM : 100   PM : 40

Marks for each question is indicated against it. Attempt all questions.
Use of scientific calculator is allowed.

PART A (50 MARKS)

1. Name and explain in short any three methods commonly used for measurement of discharge of stream or river.   **(3×2=6)**

2. Name and explain in short any two methods employed for determination of velocity of water flowing in the stream.   **(2×2=4)**

3. Calculate available power potential with the following given data.   **(5)**

Discharge	1500lits/sec
Net head	120.0meters
Efficiency	80%

4. Calculate discharge of the stream having water velocity of 5m/sec with an area of flow 16sqm.   **(5)**

5. Give short answers to the following.   **(5×3=15)**
    (a) What type of data is collected with stream gauging?
    (b) What data are required for calculation of power potential?
    (c) What is the difference between Run-of-the river scheme and storage type of hydel project?
    (d) What is the main disadvantage of Run-of-the river scheme hydel project in Mizoram?
    (e) What factors are required to be considered for calculation of net head?

6. State True or False.   **(5×2=10)**
    (a) V-notches are recommended for measuring discharge up to 25lits/sec.
    (b) Wetted perimeter is the surface which is in contact with the fluid/liquid.
    (c) Maximum velocity and discharge in rectangular channel occur when the depth of the channel is equal to the breadth.
    (d) Darcy's frictional coefficient varies from 0.0005 for new pipe to 0.01 for old pipe.
    (e) Piezometer is used to measure atmospheric pressure.

7. State the difference between the following.   **(2×2.5=5)**
    (a) Gross head and net head.
    (b) Power channel and penstock.

PART B (50 MARKS)

8. Explain in short the main function of the following structures/components in hydel project.

(10×3=30)

  (a) Weir

  (b) Power Channel

  (c) Forebay

  (d) Penstock

  (e) Power House

  (f) Tailrace channel

  (g) Desilting Tank

  (h) Sluice gate

  (i) Expansion joint

  (j) Trash rack

9. Differentiate between Impulse turbine and Reaction turbine. Give appropriate conditions for installation of each with example. **(5)**

10. Fill in the blanks. **(5×2=10)**

  (a) No of bricks in one cubic meter of brick masonry is _____ nos.

  (b) Ist class brick should not increase in weight by more than _____ % on being soaked in water for 24hours.

  (c) A brick cut across width without changing the length is called _____ closer.

  (d) Absorbtion of good quality stone should be less than _____ %.

  (e) Size of modular brick (without mortar) is _____ X_____ X_____ mm.

11. Define pointing in brick or stone masonry. What is the advantage of pointing? **(5)**

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