MIZORAM PUBLIC SERVICE COMMISSION

DEPARTMENTAL EXAMINATIONS FOR JUNIOR ENGINEER UNDER POWER & ELECTRICITY DEPARTMENT, GOVERNMENT OF MIZORAM, JUNE-2024.

ELECTRICAL ENGINEERING PAPER

Time Allowed : 3 hours   FM : 100 PM : 40

Marks for each question is indicated against it.
Attempt all questions.

PART 'A' (50 MARKS)

1. Fill in the blanks: (5×1=5)

(a) The capacity of a cell is measured in _____.

(b) Transformer cores are laminated in order to minimize _____ loss

(c) No-load test on a transformer is carried out to determine _____ loss.

(d) Kaplan Turbine operates at _____ head

(e) In the Electricity Act, 2003, "Authority" means _____.

2. Choose the correct answer: (5×1=5)

(a) The efficiency of a transformer is maximum when

    (i) It runs at half load   (ii) It runs at full load

    (iii) Its Copper loss equals Iron loss   (iv) It runs slightly overload

(b) In a Hydro Electric Plant, which of the following is used to discharged surplus water

    (i) Forebay   (ii) Penstock

    (iii) Spillway   (iv) None of the above

(c) Transformer oil is used for

    (i) Insulation   (ii) Cooling

    (iii) Both (i) & (ii)   (iv) None of the above

(d) In aluminium conductors, steel core is provided to

    (i) compensate for skin effect   (ii) neutralize proximity effect

    (iii) reduce line inductance   (iv) increase the tensile strength

(e) A circuit is disconnected by isolators when

    (i) line is energized   (ii) there is no current in the line

    (iii) line is on full load   (iv) circuit breaker is not open

3. List out the materials required for -   (1×10=10)

(i) Construction of 5 Km, 3-Phase 11kV line using Racoon Conductor assuming line span of 120 Mtrs.

OR

(ii) Construction of 1×250 kVA, 11/0.433 Ground Mounted Distribution Transformer with Street Light Metering unit.

4. What are the functions of Battery bank in a Sub-Station? What is Boost Charging and Float Charging? **(5)**

5. What is Earthing? Explain the method of earthing for 250kVA, 11/0.433kV Distribution Transformer with drawing mentioning all dimensions. **(7)**

6. What are the clearance requirement as per CEA (Measures relating to Safety and Electric Supply) Regulation, 2023? **(4×2=8)**
    (i) Minimum clearance for lines of Voltage not exceeding 650V across the road.
    (ii) Vertical and horizontal Clearance of line of voltage not exceeding 650V above/adjascent building.
    (iii) Vertical Clearance for line of voltage between 650V and 33kV above building.
    (iv) Horizontal Clearance for line of voltages exceeding 650 V and up to and including 11 kV.

7. Write short notes on **any Four (4).** **(4×2.5 = 10)**
    (a) Surge tank
    (b) Ferranti effect
    (c) Buchholz Relay
    (d) Circuit breaker
    (e) Sag

PART 'B' (50 MARKS)

8. Fill in the blanks: **(5×1=5)**
    (a) Tong Tester is used for measuring _____.
    (b) Current Transformer and Potential Transformer are _____ Transformer
    (c) Temporary connection shall be granted for a maximum period of _____ at a time.
    (d) The burden of CT's is expressed in terms of _____.
    (e) Siemens is a SI unit of _____.

9. Write the full form of the following: **(5×1=5)**
    (a) JERC(M&M)
    (b) MDI
    (c) NERLDC
    (d) CRO
    (e) NABL

10. Write short notes on **any 4 (four)** :– **(4×2.5=10)**
    (i) Net metering
    (ii) Contracted Load
    (iii) Billing Demand
    (iv) AT&C Loss
    (v) Load Factor

*Direction for Questions No. 11-14: Answer **any three (3)** of the following:* **(3×10=30)**

11. Prepare an estimate for construction of 1.5 Km 3-Phase, 4 wire LT line considering line span of 35 Meters using P&E Department SOR 2023.

12. Write down the classification of consumers into various tariff categories in LT Supply and HT Supply as per P&ED Tariff Order for FY 2024-25.

13. Write down the formula for calculating Load Security as per JERC(M&M) Electricity Supply Code Regulation 2013 and determine Load Security by giving example.

14. As per JERC(M&M) Electricity Supply Code Regulation 2013, what documents shall be considered as proof of identity in case of individual applicant for new service connection.

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