

MIZORAM PUBLIC SERVICE COMMISSION

DEPARTMENTAL EXAMINATIONS FOR JUNIOR ENGINEER (CIVIL & ELECTRICAL) UNDER POWER & ELECTRICITY DEPARTMENT, SEPTEMBER, 2018.

ELECTRICAL ENGINEERING PAPER

Time Allowed : 3 hours

FM : 100 PM : 40

*The figures in the margin indicate full marks for the questions.
Attempt all questions.*

1. As per IE Act 2003, to whom must an application be submitted for removal of trees, object or structure encroaching the existing transmission or distribution lines which is interrupting or interfering or likely to interrupt or interfere with the conveyance or transmission of electricity or the accessible to any works? (2)
2. For theft of electricity, the penalty impose can be imprisonment or fine or both depending on the cases. In case of imprisonment, how long can the terms of year be extended? (2)
3. What is the difference between contracted load and connected load? (5)
4. What is the standard range or band of frequency that must maintained for supply of power? (2)
5. Calculate the connected load in watts of a new applicant whose proposed electrical fittings and appliances are shown below: (5)
 - (a) LED bulb (9W) = 5 nos.
 - (b) Tube light (40W) = 5 nos.
 - (c) Television (90W) = 1 no.
 - (d) Refrigerator (150W) = 1 no.
 - (e) Electric iron (750W) = 1 no.
 - (f) Washing machine (750W) = 1 no.
 - (g) Water pump (1 HP) = 1 no
 - (h) Spare 5A plug (500W) = 3 nos.
6. If an external load of 2 kW is used for testing of energy meter for consumption of 1 kWh, how much time is prescribed by the JERC M&M for observation of the pulses? (2)
7. Write the formula for Load Factor in terms percentage. If the Load Factor increases, how will it effect the cost of energy? (5)
8. What is the generating voltage of 3x4MW Serlui 'B' SHP? At what voltage level it is injected to Grid? (4)

9. Choose the correct answer: (10)
- (a) While designing hydro-electric project, the life of electro-mechanical generating equipments shall not be less than 15/35/45 years.
 - (b) The rated current of an isolator must be at least 430A/630A/830A at 36kV.
 - (c) For 33kV and 11kV line construction, double pole structure must be used for angle of deviation more than 10 degree/15 degree/ 20 degree.
 - (d) Pole earthing of LT line must be done after every 3rd/ 4th/ 5th consecutive pole.
 - (e) As per O&M guidelines for Lines and Sub-Stations, February 2017 issued by P&E Department, the recommended Breakdown Value of Oil for new Distribution Transformer must be 15kV/ 20kV/30kV.

10. What is the full form of PLCC? (2)
11. What is the standard voltage rating of DC System for protection and control of 33 kV Sub-Station? (2)
12. In Power and control cables FRLS type cable are used. What does FRLS stands for? (2)
13. What is the latest Schedule of Rates and when is the effective date? How do you calculate supervision charge? (4)
14. Mention any two type of 33kV Outdoor Circuit Breakers used in existing Sub-Stations in Mizoram? (2)
15. What is the rated secondary current of 11kV Current Transformer? (2)
16. Explain vector group Dyn11 specified in Transformer nameplate? (4)
17. What type of tower foot earthing is normally used in construction of transmission line in Mizoram? (2)
18. How much is the permissible tower footing resistance? (2)
19. Fig A. is a 100-50/1A 33kV CT terminal drawing. Which secondary terminals are to be connected if the CT ratio is to be set at 100/1A? (P denotes primary and S denotes secondary) (4)

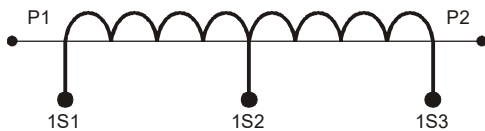
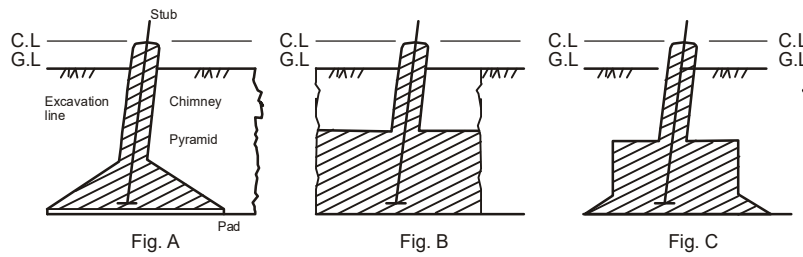


Fig. A

20. What is the rated rms voltage and discharge current of 33kV Lightning/Surge Arrestor? (2)
21. Mention the seven major components of works for erection of transmission lines? (5)
22. What is the standard building clearance of the following for voltage not exceeding 650V: (2)
- (a) Vertical clearance (in mtr.);
 - (b) Horizontal clearance (in mtr.)
23. What is the formula for Polarization Index (P.I)? What is the recommended value as per O&M guidelines for Lines and Sub-Stations, February 2017 issued by P&E Department? (5)
24. How many hours will be required to fully discharge 100AH if the discharging current is 10A? (2)

25. Fig A, Fig B and Fig C shown below are different type of foundation. Which figure is most commonly used in construction of transmission line in Mizoram? (2)

Types fo Tower foundations



26. What are the main electrical equipments required if an additional 33kV Feeder Bay is to be constructed? (5)
27. Calculate the short-circuit current on the HV side of 33/11kV 1.6MVA Power Transformer whose parameter are as shown below: (7)
- | | |
|-----------------------------|----------|
| HV rated voltage | = 33kV |
| HV rated current | = 27.99A |
| % Impedance | = 8% |
| Supplied voltage at HV side | = 415V |
28. The reading of 11kV panel energy meter is 120 units. The panel PT ratio is 11000/110V and CT ratio is 100/5A. If the energy meter is calibrated for 110V, CT ratio 25/5A what will be the actual meter reading? (7)
