

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 – II
(Computer Science Engineers under Electrical Wing)

Time Allowed : 3 hours

FM : 100 PM : 40

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

PART - A (50-MARKS)

This Section should be answered only on the Separate Answer Sheet provided.

Direction (Questions No. 1 - 20) : Multiple Choice Questions:

(20×1=20)

1. A network with more than two ends is called:
(a) Switched WAN (b) Point to Point WAN
(c) Internetwork (d) Dual WAN
2. In TCP/IP, a network router is involved in:
(a) All layers (b) 2 layers
(c) 3 layers (d) 4 layers
3. Which of the following data units is encapsulated in a frame?
(a) A user datagram (b) a datagram
(c) a segment (d) both B&C
4. Active web documents can be created using:
(a) Extensible Markup language (XML) (b) Hypertext Markup Language (HTML)
(c) Active Server Pages (ASP) (d) Java applets
5. An attacker masquerading as somebody else and creating an IP packet that carries the source address of another computer is called _____.
(a) IP Spoofing (b) IP Phishing
(c) Packet sniffing (d) IP Sec
6. Which of the following attacks is a threat to availability?
(a) Repudiation (b) Denial of service
(c) Modification (d) All of the above
7. Which of the following uses symmetric key agreement?
(a) Session Key protocol (b) Multiple KDCs
(c) Symmetric Key Distribution (d) Diffie- Hellman protocol

8. In IPV4 addressing, the block 255.255.255.255 is used for which purpose:
- (a) Host address
 - (b) Limited broadcast address
 - (c) Loopback address
 - (d) Multicast address
9. The data in the database at a particular moment in time is called ____.
- (a) Schema
 - (b) Data model
 - (c) Snapshot
 - (d) Meta-data
10. A high level DML used in a standalone interactive manner is called ____.
- (a) Host language
 - (b) Query language
 - (c) Data definition language
 - (d) Data sub-language
11. SQL Systems are:
- (a) A representation of a database as a collection of tables
 - (b) The definition of database in terms of objects
 - (c) A system based on the relational data model
 - (d) Based on XML model
12. The basic concept that the ER model represents is:
- (a) Entity
 - (b) entity sets
 - (c) Attributes
 - (d) Composite attributes
13. The existence of an entity depends on its being related to another entity via the relationship type. This is specified by ____.
- (a) Participation constraint
 - (b) Existence dependency
 - (c) Structural constraint
 - (d) None of the above
14. The referential integrity constraint is specified between relations and is used to maintain consistency among ____ in the two relations
- (a) Attributes
 - (b) Tuples
 - (c) Assertions
 - (d) Domains
15. Which of the following is NOT a schema model?
- (a) Views
 - (b) Types
 - (c) Entity
 - (d) Authorization grants
16. A virtual memory is:
- (a) An illusion of a large main memory
 - (b) A large main memory
 - (c) A large secondary memory
 - (d) The space between main and secondary memory
17. Which of the following page replacement algorithms suffer from Belady's anomaly?
- (a) LRU
 - (b) Optimal Page Replacement
 - (c) FIFO
 - (d) Both LRU & FIFO
18. A page fault occurs when:
- (a) The page is corrupted
 - (b) The requested page is in the memory
 - (c) An exception is thrown
 - (d) The requested page is not in the memory

19. Which of the following is not shared by the same process's threads?
- (a) Address space
 - (b) Stack
 - (c) Message queue
 - (d) File Description table
20. An OS implements a policy that needs a process to release all of the resources before it makes any requests for another resource. Out of the statements below, select one that is TRUE.
- (a) Both deadlock and starvation can occur
 - (b) Deadlock cannot occur but starvation can occur
 - (c) Deadlock can occur but starvation cannot occur
 - (d) Neither deadlock nor starvation can occur

Direction (Question No. 21 - 29) : Answer any six

(6×5=30)

21. What is a firewall? Explain its classifications.
22. Explain OSI model.
23. Explain VPN. How does it work?
24. Explain functions of CREATE command.
25. Explain Entity integrity, referential integrity & foreign Keys.
26. Construct an ER Schema diagram for a company database.
27. What is scheduling in operating systems? Describe different scheduling algorithms.
28. Describe deadlock detection and its recovery.
29. Describe system call and system call types.

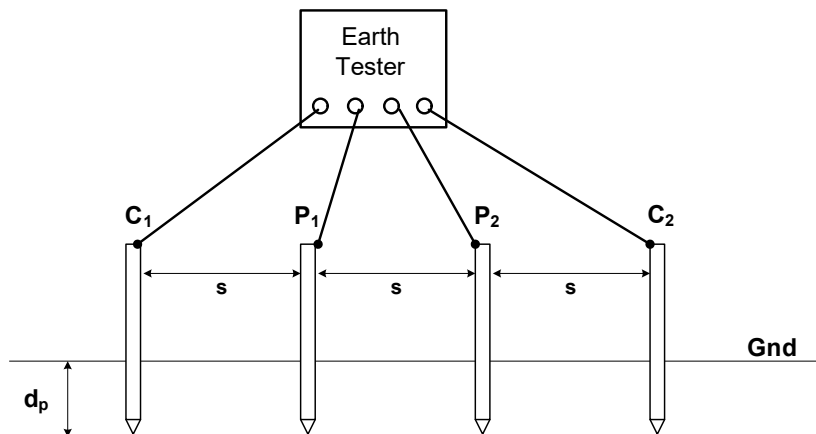
PART - B (50-MARKS)

This Section should be answered only on the Separate Answer Sheet provided.

1. What the short-circuit current on the LV side of 132/33kV 12.5MVA Power Transformer whose % impedance is 9.6%? (5)
2. Insulation resistance of 1.6MVA, 33/11kV transformer is measured between HV and LV side and the result obtained is shown below: (5)
 - (a) 0.48 GV after 10 minutes
 - (b) 0.23 GV after 1 minutes
 - (c) 0.15 GV after 30 seconds

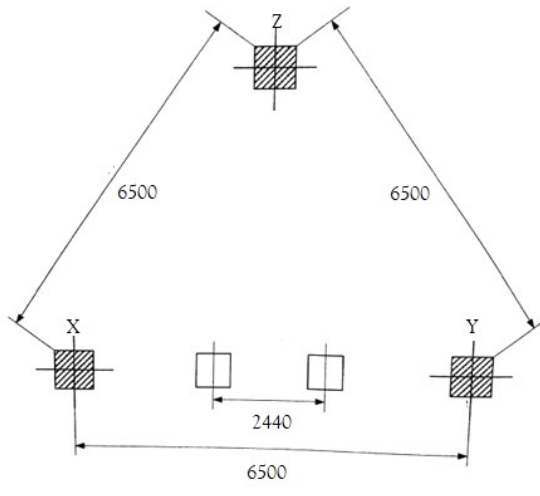
Calculate the Polarization Index (PI) value and the Dielectric Absorption Ratio (DAR) value?

3. Calculate the apparent soil resistivity from below figure where the distance between the four electrodes, $s = 4$ mtrs and the earth tester reading, $R = 9.8\Omega$. What is the recommended depth of each electrode below earth surface, d_p ? (5)

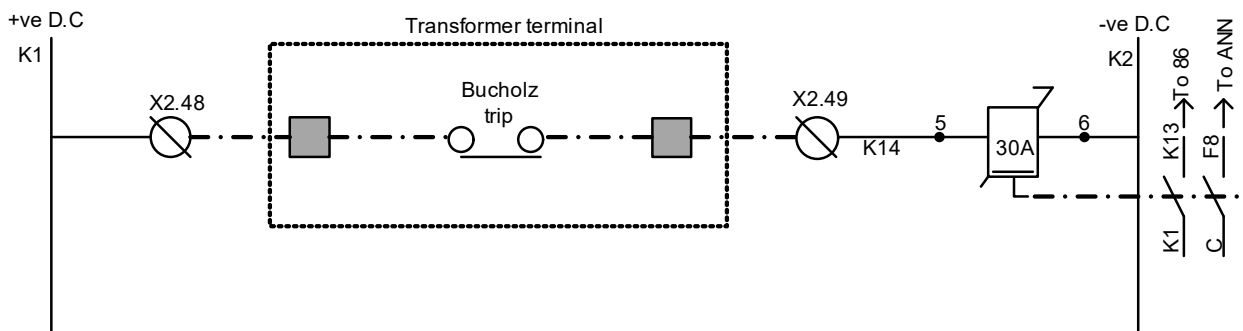


4.
 - (a) What is the highest available transformation voltage level in transmission system in Mizoram?
 - (b) Name all the location of Power Substations interconnecting with highest system voltage.
 - (c) What is the proposed voltage level of the new double circuit transmission line between Silchar and Sihhmui, Sairang Sub-station? (5)
5.
 - (a) Mention three differences between CT and PT? (5)
 - (b) Why is CVT used in long transmission lines instead of PT?
6.
 - (a) In the technical specification of 33kV Outdoor Vacuum Circuit Breaker the following rated values are given 36kV, 1250A & 25kA. What are these rated values?
 - (b) What is the rated voltage of tripping & closing coil for 33kV Outdoor type CB commonly used in Mizoram?
 - (c) What is the function trip supervision circuit in CB? Will the CB trips if the trip supervision circuit is faulty? (5)

7. Figure below shows the schematic diagram of Distribution Transformer Earthing. Describe the connections to the three electrodes X, Y, Z. (5)



8. The total unit of 11kV panel energy meter for one month is 340kWh. The external PT ratio is 11000/110V and CT ratio is 50/5A. If the energy meter is calibrated for PT ratio 11000/110V, CT ratio 25/5A what will be the actual energy in kWh? (5)
9. Figure below shows transformer auxiliary protection scheme, where NO contact of Bucholz Trip at Transformer marshalling box is connected to Auxilliary Relay of 33kV C&R panel having coil 30A. What will happen if NO contact of Bucholz trip closes due to fault sensed by Bucholz Relay of 10 MVA, 33/11kV Power Transformer? (5)



10. (a) How many poles will be required in 1 km of LT ABC line if standard spacing between each pole is maintained as per SOR 2020? (5)
- (b) In 33kV and 11kV line construction, when shall double pole structure must be used?
- (c) How many hours new transmission line shall be charged for observation?

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