higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

FAULT FINDING AND PROTECTIVE DEVICES N6

6 April 2020

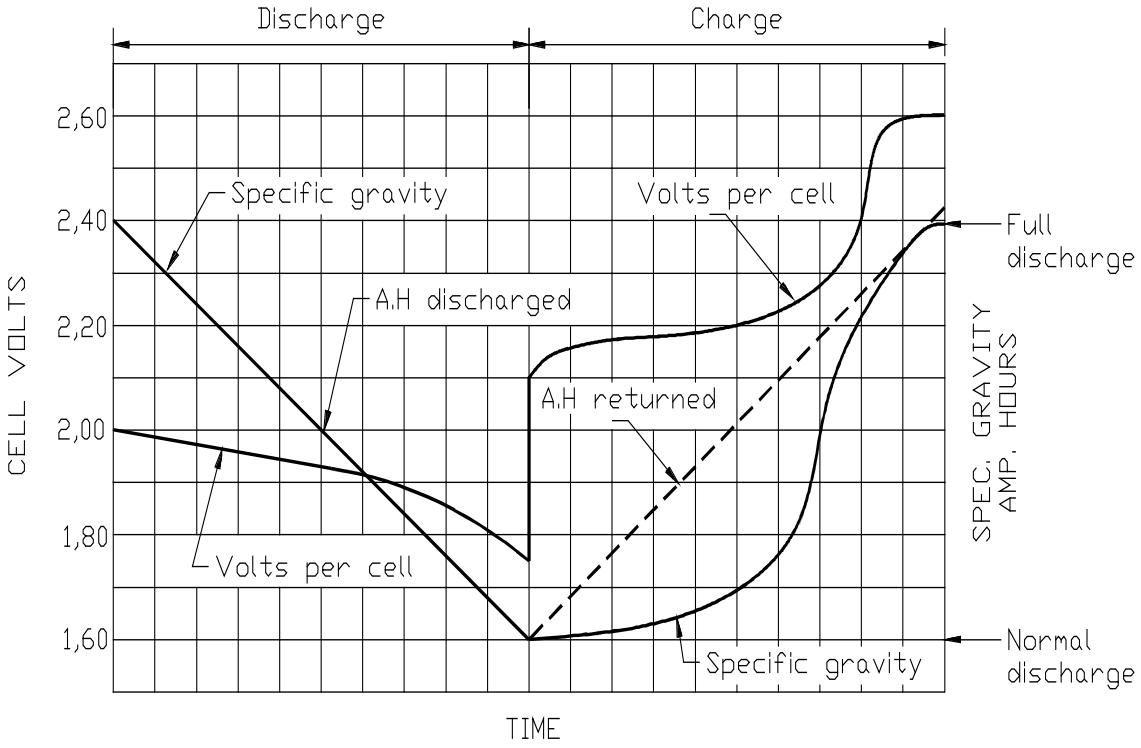
This marking guideline consists of 6 pages.

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QUESTION 1

1.1 Trickle charge refers to charging a battery under a no-load state continuously to maintain a fully charged condition. (2)

1.2



(6)

1.3 1.3.1 Distilled water
1.3.2 Distilled water
1.3.3 Potassium hydroxide solution

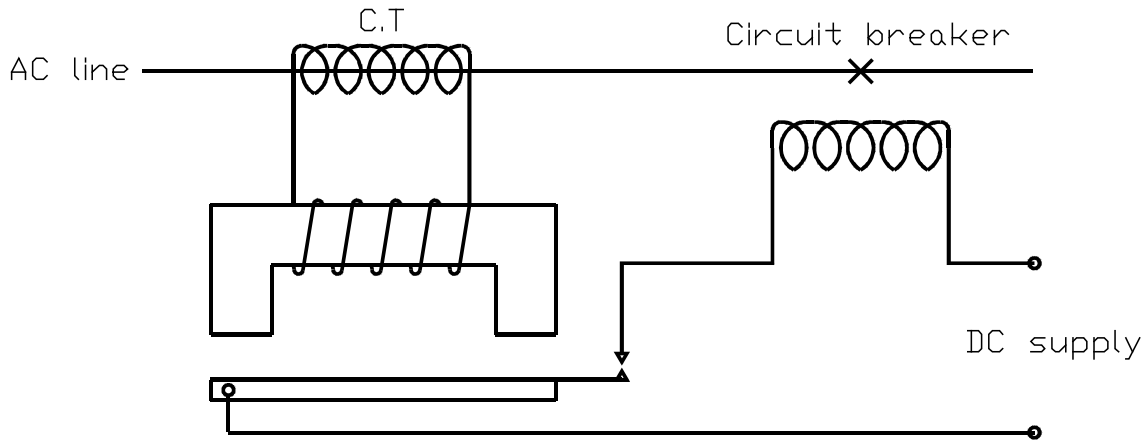
(3 × 1) (3)
[11]

QUESTION 2

2.1
- Reed relay
- Timer relay
- Overcurrent relay
- Undervoltage relay
- Thermal overcurrent relay
- Solenoid
- Differential-switch relay
- Core-balance relay (8)

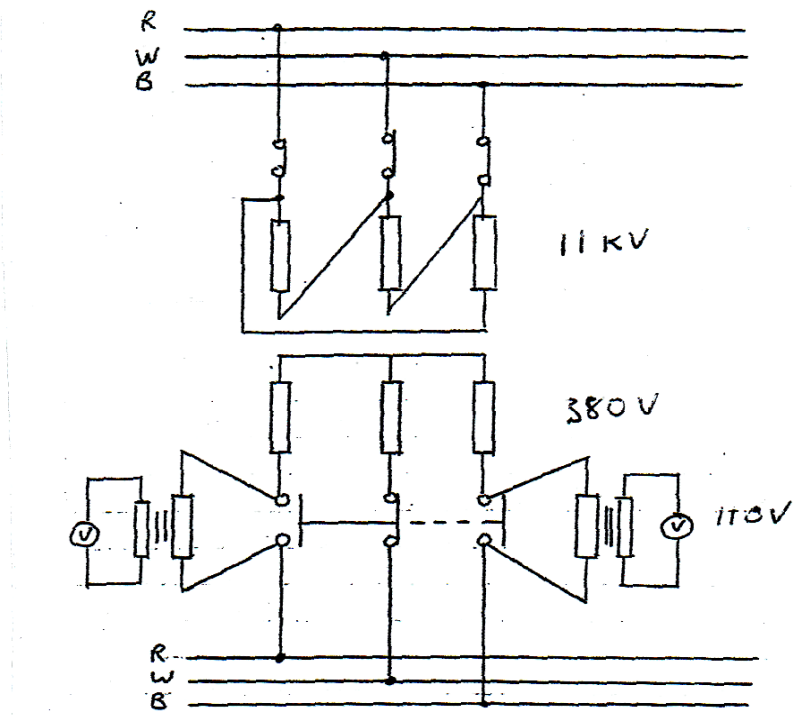
2.2
- Current transformer
- Voltage transformer
- Relay
- Circuit-breaker
- Batteries (5)

2.3



(5)

2.4



(6)
[24]

QUESTION 3

3.1
- Impulse test
- Power-frequency test
- Temperature test
- Short-circuit test
- Verification of making and breaking test
- Mechanical-operation test
- Weather-proofing test (Any 3 × 1) (3)

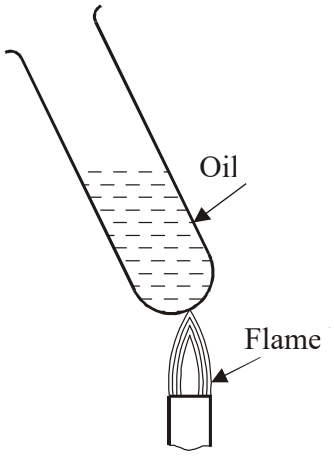
3.2
- Less bulky
- Quieter
- Contact burning limited
- Nontoxic and nonflammable
- Arc product is powder and easily removed
- Reduced number of breaks in series per phase (6)

3.3
- Sufficiently sensitive for detecting a fault in its early stages
- Isolates the faulty part completely
- Reliable and robust
- Discriminates between fault currents (4)

[13]

QUESTION 4

4.1 Fill a clean test tube with oil. Heat the oil rapidly until it boils. If water is present in the oil a crackle sound will be heard.

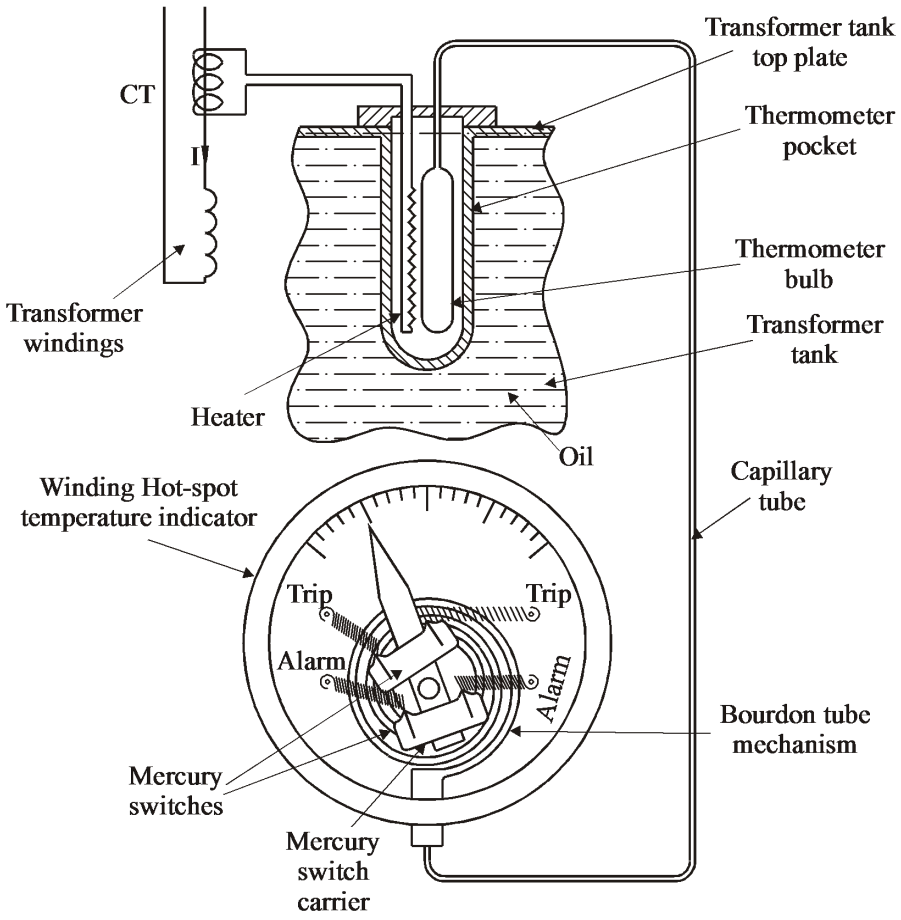


(4)

4.2
- Same rating (KVA)
- Same operating voltages
- Same phase rotation
- Connected with the same polarity
- Same vector group
- Same phase displacement angle
- Same per unit impedance
- Same operating temperature (Any 7 × 1) (7)

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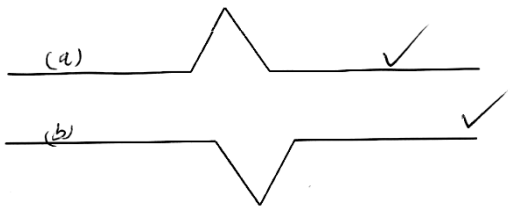
4.3



(7)
[18]

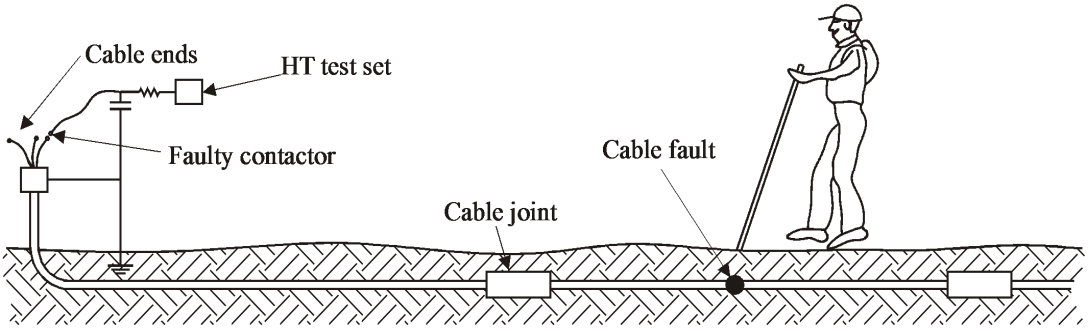
QUESTION 5

5.1



(2)

5.2



HT from test source charges up C via R. Faulty conductor voltages rise until it flashes over the fault. Charge on C drops and again charges up from supply via R.✓ There is thus a regular flash at the fault.✓ The fault-finder proceeds along the cable in the vicinity of where the fault is suspected and listens for flashing, using a pointed stick with an amplifier.✓

(6)

5.3
- Inspect cable terminals.
- Analyse the fault.
- Burn out the fault if necessary.
- Conduct a location test from the terminals.
- Conduct a local confirmatory test. (5)

[13]

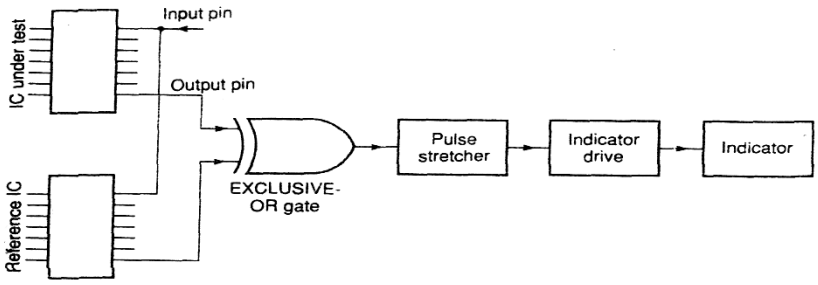
QUESTION 6

6.1
- Natural commutation
- Forced commutation (2)

6.2
- Controlling armature current
- Producing current limit operation
- Limiting maximum armature current to safe value (3)

6.3
- No more than two technicians should work on a digital troubleshooting task at the same time.
- Always correct obvious faults first.
- Proceed with caution and ensure that no trouble symptoms are ignored.
- Analyse and subdivide the symptoms.
- Never make any unsubstantiated assumptions.
- Ensure that the central processing unit is working.
- Take a break after prescribed hours of troubleshooting.
- Review your work after repairing a fault and be critical. (8)

6.4



(8)

[21]

TOTAL: 100

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