

School: SOE	Level: BE	Invigilator's Sign:
Program: BEEE	Year/Part: III/II	Superintendent's Sign:
Subject: Power System Protection - EG654EE		Code No.

i. Answers should be given by filling the Multiple-Choice Questions' Answer Sheet.

ii. The main answer sheet can be used for rough work.

Code No.

GROUP A (Multiple-Choice Questions)	[10x1=10]	Time: 20 Minutes
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1. The purpose of backup protection is
 - i. To increase the speed
 - ii. To increase a reach
 - iii. To leave no blind spot
 - iv. To guard against failure of primary
2. The primary winding of a C.T. has
 - i. larger number of turns
 - ii. no turns at all
 - iii. intermediate number of turns
 - iv. a few turns
3. The material used in liquid fuse is
 - i. SF₆
 - ii. Distilled water
 - iii. Carbon tetra chloride
 - iv. Transformer oil
4. Moisture content in the soil _____ the earth soil resistance.
 - i. Increase
 - ii. Decrease
 - iii. Does not affect
 - iv. None of the above
5. The magnitude of the fault current depends upon
 - i. Total impedance up to the fault
 - ii. Voltage at the fault point
 - iii. Load current being supplied before occurrence of the fault
 - iv. Both (i) and (ii)
6. A transformer rated for 500 kVA, 11 kV/0.4 kV has an impedance of 10% and is connected to an infinite bus. The fault level of the transformer is
 - i. 500 kVA

- ii. 5000 kVA
 - iii. 500 MVA
 - iv. None of these
7. Which of the circuit breakers has the lowest operating voltage?
 - i. SF₆ gas
 - ii. Air-break
 - iii. Air-blast
 - iv. Minimum oil
 8. The rating of a circuit breaker is usually determined on the basis of _____ fault.
 - i. Symmetrical
 - ii. Line to line
 - iii. Single line to ground fault
 - iv. Double line to ground fault
 9. The operating speed of the relay depends upon the
 - i. Rate of flux build up
 - ii. Armature core air-gap
 - iii. Spring tension
 - iv. All of these
 10. The mho relay is
 - i. Voltage restrained directional relay
 - ii. Voltage restrained overcurrent relay
 - iii. Directional restrained overcurrent relay
 - iv. Directional restrained overvoltage relay

Multiple Choice Questions' Answer Sheet

Marks Secured: _____

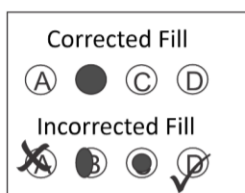
In Words: _____

Examiner's Sign: _____ Date: _____

Scrutinizer's Marks: _____

In Words: _____

Scrutinizer's Sign: _____ Date: _____



1. (A) (B) (C) (D)	6. (A) (B) (C) (D)
2. (A) (B) (C) (D)	7. (A) (B) (C) (D)
3. (A) (B) (C) (D)	8. (A) (B) (C) (D)
4. (A) (B) (C) (D)	9. (A) (B) (C) (D)
5. (A) (B) (C) (D)	10. (A) (B) (C) (D)

Manmohan Technical University
Office of the Controller of Examinations
Exam Year: 2081, mangsir

School: SOE	Level: BE	Time: 3 Hours
Program: BEEE	Year/Part: III/II	Full Marks: 50
Subject Power System Protection - EG654EE		

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ The figures in the margin indicate **Full Marks**.
- ✓ Assume suitable data if necessary.

GROUP A (Multiple-Choice Questions in separate paper)

[10×1=10]

GROUP B (Short Answer Questions - **Attempt Any Eight Question**)

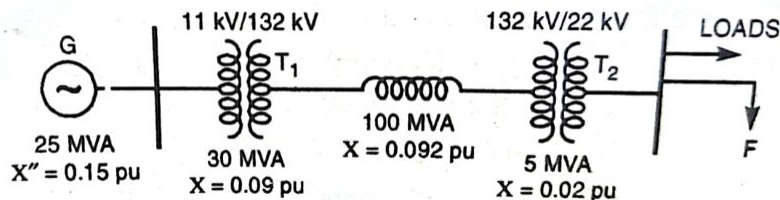
[8×2=16]

1. What are the basic requirements of any protection scheme in a power system?
2. Discuss the causes of ratio error and phase angle error in PT.
3. Explain the constructional details of HRC fuse.
4. What is isolator? Write its function in power system.
5. Briefly explain the different types of lightning arrestors used for power system protection.
6. Derive an expression to calculate symmetrical components of 3-phase unbalance currents.
7. Compare the merits and demerits of air blast circuit breaker and SF₆ circuit breaker.
8. Briefly explain the working principle of induction disc relay.
9. Write a short note on level detectors.

GROUP C (Long Answer Questions – **Attempt Any Six Questions**)

[6×4=24]

1. Develop a mathematical expression to obtain fault current of a double line to ground fault with all necessary equations and diagrams.
2. A symmetrical 3-phase short circuit fault occurs on the 22 kV bus bars of the circuit shown as one line diagram figure below. Calculate the fault current and the fault apparent power.



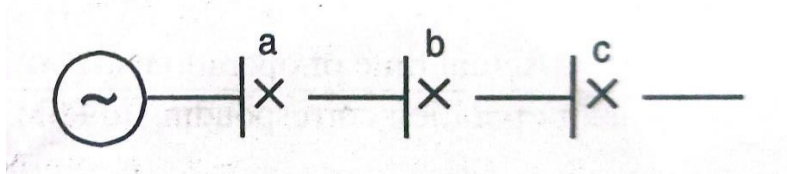
3. Explain the construction and working principle of vacuum circuit breaker. Mention its advantages and disadvantages.
4. In a short circuit test on a 3-pole, 132 kV circuit breaker p.f of the fault was 0.4, the recovery voltage was 0.90 times full-line value. The breaking current was symmetrical. The frequency of oscillation of re-striking voltage was 16 kHz. Estimate the average rate of rise of recovery voltage. The neutral is grounded and the fault does not involve the earth.

5. With a neat sketch explain the operation of differential protection scheme for a power transformer.
6. Provide time-current grading for the following system:

Relay point	CT Ratio	Fault current
a	400/5	6000 A
b	200/5	5000 A
c	200/5	4000 A

Use standard 2.2 second IDMT characteristics.

Time in seconds	30	10	7	5	3	2.2
PSM	1.0	2	3	5	10	20



7. Describe static distance relays and their area of application.

THE END