# CS/M.TECH (EE)/SEM-2/MEE-202/09 PROTECTION OF POWER SYSTEM AND APPARATUS (SEMESTER - 2 ) 

1. 

Signature of Invigilator

2.

Signature of the Officer-in-Charge

Reg. No.


Roll No. of the Candidate


CS/M.TECH (EE)/SEM-2/MEE-202/09
ENGINEERING \& MANAGEMENT EXAMINATIONS, JULY - 2009 PROTECTION OF POWER SYSTEM AND APPARATUS (SEMESTER - 2 )

Time : 3 Hours ]
[ Full Marks : 70

## INSTRUCTIONS TO THE CANDIDATES :

1. This Booklet is a Question-cum-Answer Booklet. The Booklet consists of $\mathbf{3 2}$ pages. The questions of this concerned subject commence from Page No. 3.
2. You have to answer the questions in the space provided marked 'Answer Sheet'. Write on both sides of the paper.
3. Fill in your Roll No. in the box provided as in your Admit Card before answering the questions.
4. Read the instructions given inside carefully before answering.
5. You should not forget to write the corresponding question numbers while answering.
6. Do not write your name or put any special mark in the booklet that may disclose your identity, which will render you liable to disqualification. Any candidate found copying will be subject to Disciplinary Action under the relevant rules.
7. Use of Mobile Phone and Programmable Calculator is totally prohibited in the examination hall.
8. You should return the booklet to the invigilator at the end of the examination and should not take any page of this booklet with you outside the examination hall, which will lead to disqualification.
9. Rough work, if necessary is to be done in this booklet only and cross it through.

No additional sheets are to be used and no loose paper will be provided

| FOR OFFICE USE / EVALUATION ONLY |
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| Marks Obtained |
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| Marks <br> Obtained |

Head-Examiner/Co-Ordinator/Scrutineer


# CS/M.TECH (EE)/SEM-2/MEE-202 $\% 09$ PROTECTION OF POWER SYSTEM AND APRARATUS 

 SEMESTER - 2Time : 3 Hours ]

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.

Answer any five of the following.
$5 \times 14=$

1. a) Explain in the light of the generalized theory, the complex plane characteristics obtained by a 2 -input amplitude comparator.
b) Explain the duality between a 2 -input amplitude comparator and 2 -input $90^{\circ}$ phase comparator.
2. a) State the working principle of a multi-input coincidence comparator.
b) How is block average type 2 -input $90^{\circ}$ comparator designed?
3. How does power swing affect the operation of a distance relay ? What is the remedial measure against it ?
4. a) How is a Mho characteristic of distance relay designed with the help of a $90^{\circ}$ phase comparator?
b) Design a quadrilateral characteristic of distance relay by asymmetric phase comparators.
5. a) Discuss briefly the advantages of Digital Relay over its A.C counterpart.
b) With necessary schematic diagrams discuss the function of Measurement sub-unit and Evaluation sub-unit of Digital Protection scheme.
6. Develop an algorithm for finding out $\mathrm{R} \& \mathrm{~L}$ ( Resistance \&nsuductance ) of a transmission line.

7. a) Discuss the construction, operating principle of vacuum ciscuit breaker.
b) For a 132 kV system, the reactance and capacitance up to the location of the circuit breaker is $3 \Omega$ and $0.015 \mu \mathrm{~F}$ respectively. Calculate the following :
i) The frequency of transient oscillation.
ii) The maximum value of restriking voltage across the contacts of the circuit breaker.
iii) The maximum value of RRRY.
8. Write short notes on the following :
a) $\quad \mathrm{SF}_{6}$. Circuit Breaker.
b) First Derivative method of digital protection.

END

