

B. E. POWER ENGG. 4TH YEAR 1ST SEMESTER EXAMINATION 2025

Protection and Switchgear

TIME: THREE HOURS

FULL MARKS: 100

1. a) The insulation strength of an EHV transmission line is governed by
(i) lightning over voltage (ii) switching over voltage (iii) switching over voltage and lightning
over voltage (iv) corona 3 [CO1]

b) Describe lightning over voltage. 17 [CO1]

OR

1. a) If the inductance and capacitance of a power system network upto a circuit breaker location
are 1.5 H and 0.02 μ F respectively, the value of the shunt resistor across the circuit breaker,
required for critical damping of the restriking voltage is _____. 4[CO1]

b) Describe restriking voltage. 16 [CO1]

2. a) Describe the functions of protective relay. 8 [CO2]

b) What are the fundamental requirements of protective relay? 12 [CO2]

3. a) Air-blast circuit breaker is suitable for _____. 2[CO3]

b) Describe arc extinction in a circuit breaker. 8 [CO3]

c) What are the merits and demerits of of air blast circuit breaker. 10 [CO3]

OR

3. a) The stability of arc in vacuum depends on
(i) the contact material only (ii) the contact material and its vapor pressure (iii) the circuit
parameters only (iv) the combination of (ii) and (iii) 2[CO3]

b) Why circuit breaker is necessary at every switching point in the substation? 6 [CO3]

c) Give a detail description of SF₆ breaker 12 [CO3]

4) Give a detail description of alternator protection. 20 [CO4]

OR

4. a) Give a detail description of transformer protection. 10 [CO4]

b) Describe lightning arrester. 10 [CO4]

[Turn over

5. The power system shown in Fig. 5 has a dead short circuit at the mid point of the transmission line. Find the fault current for a line-to-line fault. Both generator G and motor M are operating at their rated voltage. Neglect prefault current. Reactances are given in pu on the same base. 20 [CO5]

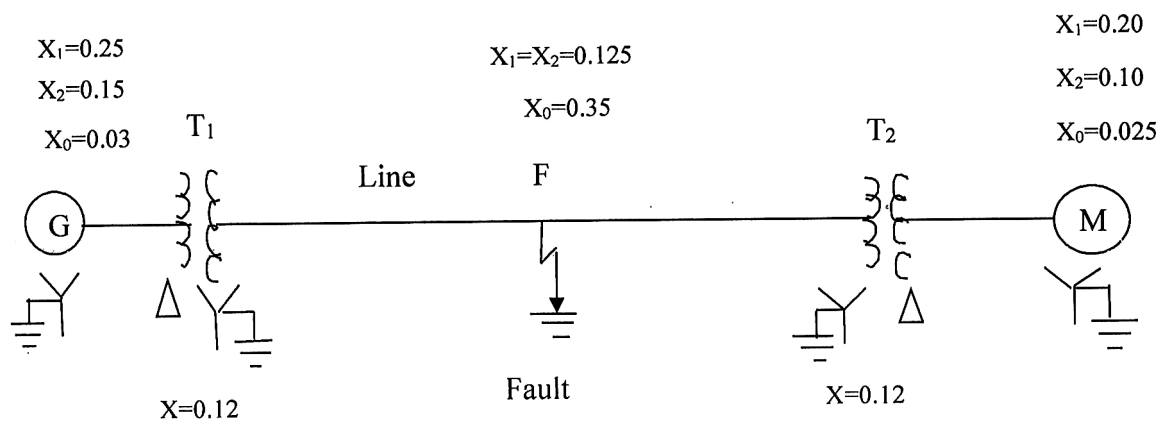


Figure 5