

JK Lakshmipat University Jaipur

INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination, December 2021

B. Tech. in Electrical & Electronics Engineering, Semester VII

Roll No.....

Course Code: EE1213

Course Name: Advances in Power Delivery

Time: 02
hours

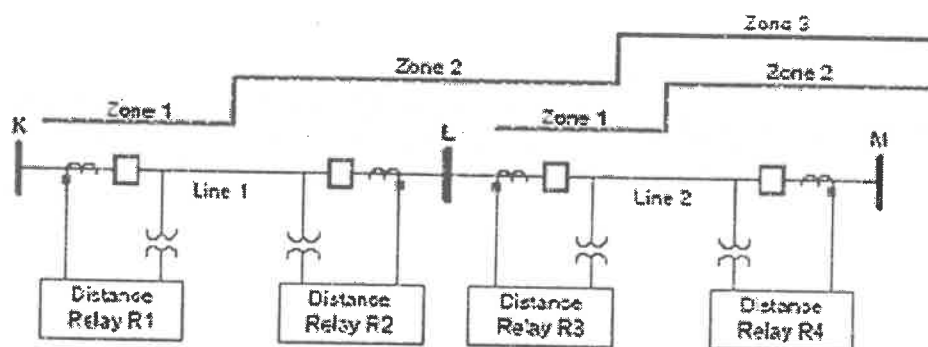
Max.
Marks: 30

Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.
4. Attach graph sheet with answer sheet properly

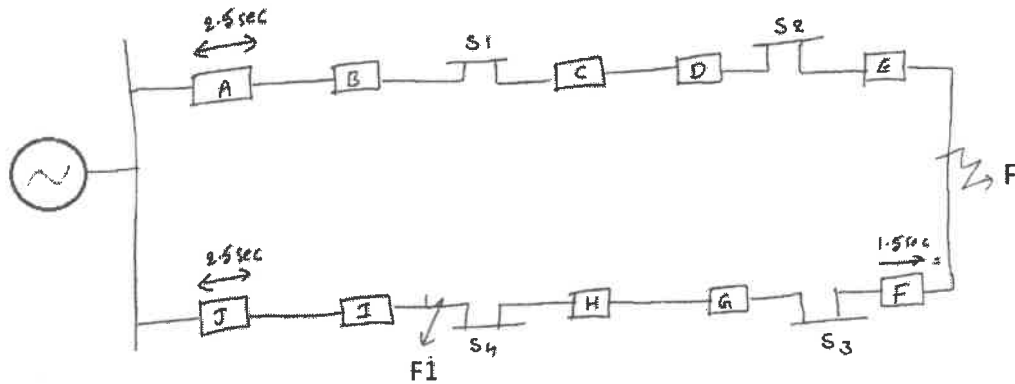
Q.1 (a) A stepped time distance protection is designed for below 220 KV [04]
transmission line. Assume

- Length of each line section = 100 Km with 60 ohm impedance.
- CT Ratio for Bus = 500/1A
- PT Ratio for each bus = 220 KV/110 V



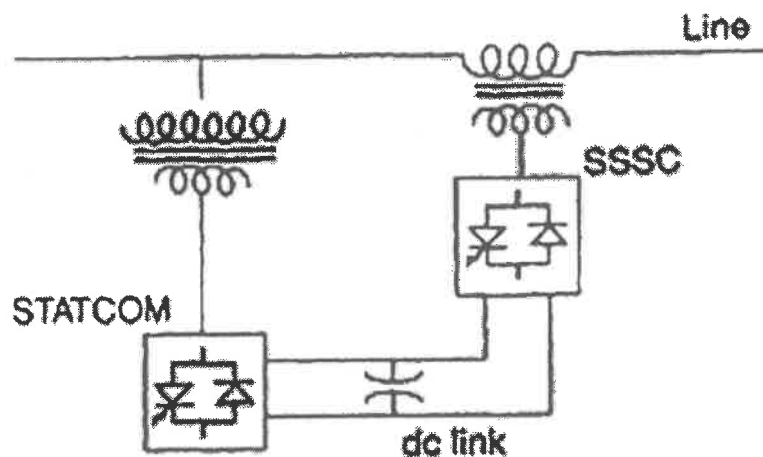
Determine Zone1, Zone 2 and Zone 3 settings for relay at bus K

- (b) Design a time graded protection for parallel feeder with nondirectional [04]
and directional relay by considering fault location at location 1 & 2.
Assume that relay nearest to substation in nondirectional relay. In
designing this protection scheme, assume 0.5 second delay between relay
operations.



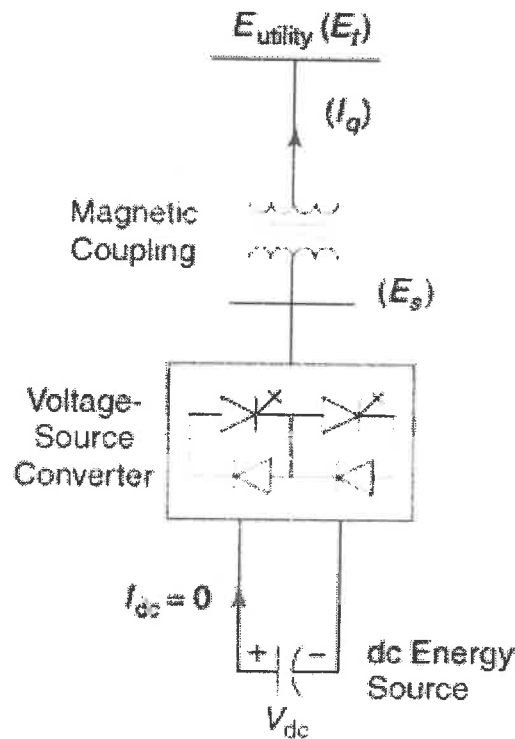
- (c) An IDMT relay is used to protect a section of line, for a fault current of 4000 Amp, PS of 125 %, TMS of 0.6 and CT ratio of 400:1, find out the time of operation of a relay [02]

- Q.2 (a) For an extra high voltage overhead transmission line, four conductors are used per phase as sub conductor (Bundle conductor) at the corner of a square of side "B" meter. Determine Geometric mean radius (GMR) of each conductor in meter. [03]
- (b) Also show that how bundle conductor impacted on corona loss, radio interference, surge impedance of the extra high voltage transmission lines. [02]
- (c) Identify below controller and with the help of vector diagram show that it improves voltage of transmission line. [05]



OR

Identify below controller and with the help of vector diagram show that it improves voltage of transmission line. [05]



- Q.3 (a) For an extra high voltage overhead transmission line, four conductors are used per phase as sub conductor (Bundle conductor) at the corner of a square of side "B" meter. Determine Geometric mean radius (GMR) of each conductor in meter. [03]
- (b) Illustrate the power handling capacity and line loss of EHVAC lines with various voltage levels. [02]
- (c) A star-connected, 3-phase, 100MVA, 11 kV alternator has a per phase reactance of 20%. It is protected by Merz-Price circulating-current principle which is set to operate for fault currents not less than 300 A. Calculate the value of earthing resistance to be provided to ensure that only 15% of the alternator winding remains unprotected [05]

