BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION)

CLASS: BE **SEMESTER: VI**
BRANCH: EEE **SESSION : SP/2019**

SUBJECT : EE6203 POWER SYSTEM-II

TIME: 1.5 HOURS **FULL MARKS: 25**

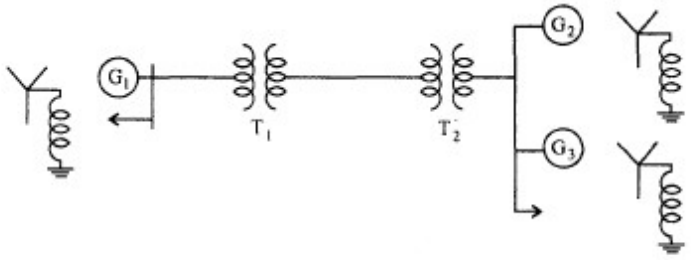
INSTRUCTIONS:
1. The total marks of the questions are 30.
2. Candidates may attempt for all 30 marks.
3. In those cases where the marks obtained exceed 25 marks, the excess will be ignored.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. The missing data, if any, may be assumed suitably.

Q1 (a) Mention some problems in power systems for which load flow analysis and short circuit analysis are required to solve the problems. [2]

(b) What are the advantages of per unit system? Can the parameters be expressed in percentage instead of expressing in per unit? Explain with one example and mention the advantages of per unit system over percentage based system [3]

Q2 (a) Draw the reactance diagram for the figure shown below. [2]

(b) Obtain the per unit representation for the three phase power system shown in figure. Choose base MVA = 50 and base voltage as 66 kV on transmission line. [3]



Generator 1 : 50 MVA, 10.5 KV; X = 1.8 ohm
Generator 2 : 25 MVA, 6.6 KV; X = 1.2 ohm
Generator 3 : 35 MVA, 6.6 KV; X = 0.6 ohm
Transformer T_1 : 30 MVA, 11/66 KV, X = 15 ohm/phase
Transformer T_2 : 25 MVA, 66/6.2 KV, as h.v. side X = 12 ohms
Transmission line : X_L = 20 ohm/phase

Q3 (a) What is the need for a slack bus or reference bus? Explain. [2]

(b) A sample power system has the following line data. Form bus admittance matrix for this system. [3]

Bus code	Series Impedance	PU line charging admittance Y/2
1-2	0.02+j0.08	0.0+j0.04
1-3	0.06+j0.24	0.0+j0.03
2-3	0.04+j0.16	0.0+j0.025
2-4	0.04+j0.16	0.0+j0.025
3-4	0.01+j0.04	0.0+j0.015

Q4 (a) Why numerical technique is used to solve load flow equations? [1]

(b) Write the steps with proper equations for solving load flow equations by Gauss-Seidel Method. [4]

Q5 (a) What is meant by fault level? [2]

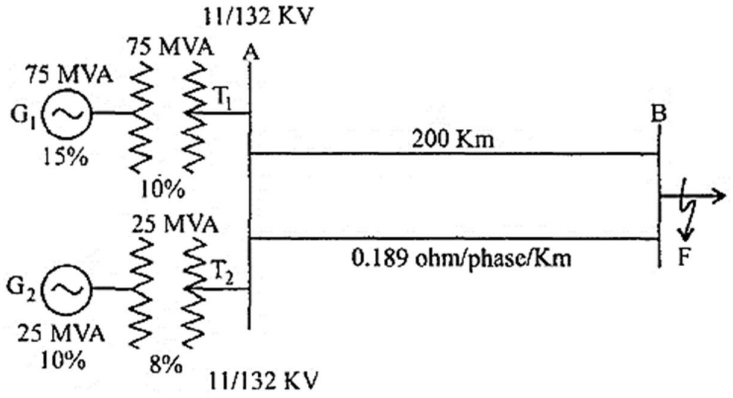
(b) A synchronous generator rated 500 kVA, 440V, 0.1 per unit sub transient reactance is supplying a passive load of 400 kW at 0.8 lagging power factor. Calculate the initial symmetrical rms current for a 3 phase fault at the generator terminals. [3]

PTO

Q6 Consider the power system in which two generators operating at 11 kV feeds through transformers a transmission system operating at 132 KV. The far end of the transmission system consisting of 200 km long double circuit line is connected to load from bus B. If a 3-phase fault occurs at bus B,

(a) Draw the reactance diagram selecting 75 MVA and 11 KV on LV side as base values [2]

(b) Determine the total fault current and fault current supplied by each generator. [3]



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