

School: SOE	Level: BE	Invigilator's Sign:
Program: BEEE	Year/Part: III/I	Superintendent's Sign:
Subject: POWER SYSTEM ANALYSIS(EG605EE)		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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- Which of the following voltage level is not used in Power System Network of Nepal?
 - 132 KV
 - 220 kV
 - 400 kV
 - 700 kV
- The Geometric Mean Radius of bundled conductors in duplex arrangement:
 - $\sqrt{r \cdot d}$
 - $\sqrt[3]{r \cdot d^2}$
 - $\sqrt[3]{d \cdot r^2}$
 - $\sqrt[3]{d \cdot r}$
- The A-parameter of π -model medium Transmission Line is given by
 - $1 + \frac{ZY}{2}$
 - Z
 - $Y \left(1 + \frac{ZY}{4}\right)$
 - $Z \left(1 + \frac{ZY}{4}\right)$
- The relation between phase current and line current in a delta connected system is:
 - $I_{ph} = 3 I_L$
 - $I_{ph} = \sqrt{3} I_L$
 - $I_{ph} = I_L / \sqrt{3}$
 - $I_{ph} = \sqrt{2} I_L$
- Which of the following insulators are generally employed in lines upto 33 kV?
 - Pin Type
 - Suspension Type
 - Post Type
 - String Type
- Which of the following is the fastest method of convergence for Power Flow Analysis?
 - Newton – Raphson Method
 - Gauss – Seidel Method
 - Fast Decoupled Method
 - Bisection Method
- The National Grid System can be considered as:
 - PV Bus
 - PQ Bus
 - Slack Bus
 - None of above
- The synchronous speed of an alternator is given by:
 - $\frac{p}{120f}$
 - $\frac{120p}{f}$
 - $\frac{120f}{p}$
 - $\frac{z\phi N p}{A}$
- The effect of the increase in voltage occurring at the receiving end of a very long transmission line is called:
 - Corona Effect
 - Skin Effect
 - Ferranti Effect
 - Transposition Effect
- The characteristic impedance can be defined as:
 - \sqrt{zy}
 - $\sqrt{z/y}$
 - $\sqrt{y/z}$
 - $\frac{1}{\sqrt{zy}}$

Multiple Choice Questions' Answer Sheet

Marks Secured: _____

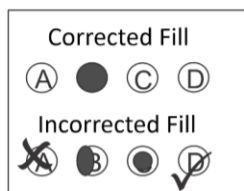
In Words: _____

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 (Model question)

School: SOE	Level: BE	Time: 3 Hours
Program: BEEE	Year/Part: III/I	Full Marks: 50
Subject: POWER SYSTEM ANALYSIS(EG605EE)		

- ✓ 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.

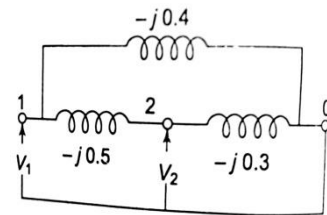
GROUP A (Multiple-Choice Questions in separate paper)

[10×1=10]

GROUP B (Short Answer Questions - Attempt Any Eight)

[8×2=16]

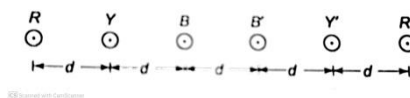
1. Describe the characteristics of existing power transmission system of Nepal.
2. Derive the expression for complex power in single phase ac circuit.
3. Obtain the expression for Inductance of Three phase line with symmetrical spacing.
4. Find the Nominal T-model equivalent parameters of a long transmission line.
5. Obtain the expression for capacitance with earth effect in a single-phase transmission line.
6. What do you mean by Ferranti effect? How can you control the voltage level at a point in a transmission line?
7. Draw the flowchart for Load studies using Gauss Seidel Method.
8. Derive the expression for swing equation for an alternator.
9. Formulate Y-bus matrix for the network shown below.



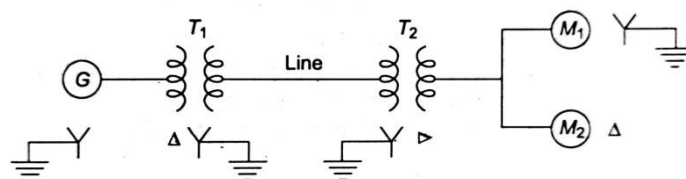
GROUP C (Long Answer Questions - Attempt Any six questions)

[6×4=24]

10. A symmetrical 3-phase double circuit line is arranged in horizontal configuration as shown in figure below. Find inductance per km per phase of the conductor if $r = 0.9$ cm and $d = 3.5$ m. [4]



11. A 90 MVA 11 kV 3-phase generator has a reactance of 25%. The generator supplies two motors through transformers and transmission line as shown in figure below. The transformer T_1 is a 3-phase transformer, 100 MVA, 10/132 kV, 6% reactance. The transformer T_2 is composed of 3 single phase units each rated at 30 MVA, 66/10 kV with 5% reactance. The connections of T_1 and T_2 are as shown. The motors are rated at 50 MVA and 40 MVA both 10 kV and 20% reactance. Taking the generator rating as base, draw reactance diagram and indicate the reactances in per unit. The reactance of line is 100 ohms. [4]



12. Derive the formula for transmission line parameters for a long Transmission line. (4)
13. A 200 km long 3 phase line has resistance of 48.7 ohms per phase, inductive reactance of 80.20 ohms per phase and capacitance of 8.42 nF per km per phase. It supplies a load of 13.5 MW at a voltage of 88 kV and power factor of 0.9 lagging. Use nominal pi model to find sending end voltage and voltage regulation. (4)
14. A suspension string has 3 units. Each unit can withstand a maximum voltage of 11 kV. The capacitance of each joint and metal work is 20% of the capacitance of each disc. Find the string efficiency (4)
15. Apply equal area criterion to describe the stability study before, during and after a fault in power system. (4)
16. The series impedance and shunt admittance of each line are $0.026 + j 0.11$ pu and $j 0.04$ pu respectively. The bus specification and power input at the buses is as below: (4)

Bus	P_G	Q_G	P_L	Q_L	Bus Voltage
1	unspecified	unspecified	1.0	0.5	$1.03+j0$ (Slack Bus)
2	1.5	unspecified	0	0	1.03 (PV Bus)
3	0	0	1.2	0.5	Unspecified (PQ Bus)

- a) Form $[Y_{bus}]$ matrix.
 b) Write the equation for first iteration using Newton-Raphshon method.

