Seat No.: _____

Enrolment No.____

TotalMarks: 70

PDDC– SEMESTER IV– • EXAMINATION – SUMM	ER - 2016
Subject Code: X40903	Date:21/11/2016
Subject Name: Power System Analysis and Simulation	

Time:02:30 PM to 5:00 PM Instructions:

- 1. Attempt all questions.
- 2. Make suitable assumptions wherever necessary.
- 3. Figures to the right indicate full marks.
- 4. Symbols have their usual meanings

Q.1

- (a) A 220 kV, 50Hz, 3- Φ transmission line is 50 km long. The resistance is 0.15 Ω /phase and (7)inductance per phase is 1.33 mH/km. Shunt capacitance is negligible. Use short line model to determine (i) the voltage and power at the sending end (ii) voltage regulation and efficiency when the line is supplying a three phase load of 400 MW, 220 kV at 0.8 pf lagging
- (b) Derive the value of ABCD constants for a medium length line represented by nominal-T (7) model

O.2

- (a) With the help of vector diagram, explain the working of synchronous generator feeding (7)constant power with variable excitation
- (b) Prove that per-unit impedance of a transformer remains same whether referred to primary (7)or secondary side, if the voltage bases are selected according to the transformation ratio of a transformer

OR

(b) Explain the concept of subtransient, transient and steady reactance in synchronous machine (7)

Q.3

(a) A synchronous generator rated 500 kVA, 440 V, 0.1 pu subtransient reactance is supplying	(7)
a passive load of 400 kW at 0.8 lagging power factor. Calculate the initial symmetrical	
rms current for a three phase fault at the generator terminals	
(b) Write a short note on selection of circuit breakers	(7)

OR

(b) Write a short note on selection of circuit breakers

0.3

(a) Give the relationship between vector of original phasors and vector of symmetrical (7) components. Also show that symmetrical component transformation is power invariant (b) Derive the value of sequence impedances for a fully transposed line (7)

Q.4

- (a) The phase currents in a star connected unbalanced load are Ia = 44 i33, Ib = -32 i24, (7)Ic = -40 + j25. Find the value of sequence currents Ia₁, Ia₂ and Ia₀
- (b) Derive the expression for fault current in case single line to ground fault at the terminals of (7)unloaded synchronous generator

Q.4

(a) A 3-Φ synchronous generator rated 25 MVA has positive, negative and zero sequence reactance per phase of i1 0Ω i0 8Ω and i0 4Ω respectively. The po-load voltage between	(7)
the lines is 11 kV. The generator neutral is solidly earthed. Calculate the value of fault	
current in the earth return circuit for a double line to ground fault at the generator terminals	
(b) Derive the equation for sending end voltage and current for a long transmission line	(7)
0.5	
(a) What is corona? State the advantages and disadvantages of corona	(7)
(b) Which are the methods of neutral grounding? Also mention the advantages of neutral	(7)
grounding.	(.)
OR	
Q.5	
(a) Explain how reflection of voltage and current waves take place when line is (i) open	(7)
circuited at the receiving end (ii) short circuited at the receiving end	
(b) Derive the equation for attenuation of a travelling wave	(7)